University of Alberta

Occupational Stress and Job Satisfaction among Canadian Orthodontists

by

Stephen Franz Roth

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

in

Orthodontics

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"Slow but steady wins the race."

Aesop

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Occupational Stress and Job Satisfaction among Canadian Orthodontists submitted by Stephen Franz Roth in partial fulfillment of the requirements for the degree of Master of Science in Orthodontics.

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Abstract

An anonymous, self-administered, mail-out survey was distributed to Canadian orthodontists to evaluate occupational stress (OS) and job satisfaction (JS). The survey collected demographic information, evaluated OS using a list of potential stressors in orthodontics, and measured JS using a modified version of the Dentists Satisfaction Survey.

The response rate was 51.2% (335/654).

Large variation was seen in the evaluation of potentially stressful items and overall OS. The most concerning stressors in orthodontic practice involved time-management and patient cooperation issues.

JS in orthodontics was high (79.3%), but some practitioners were dissatisfied (2.5%). The most satisfying aspects were delivery of care, relationships with patients, staff and colleagues and the respect derived from orthodontics. The least satisfying aspects were practice management and the amount of personal time.

A significant relationship exists between OS and JS, but both are more affected by other factors, such as personality, than the characteristics evaluated by this survey.

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Preface

This thesis documents a research project describing occupational stress and job satisfaction among Canadian orthodontists. The material is presented in five chapters. Chapter 1 provides background knowledge on the topic and outlines the objectives of the project. This chapter was written to familiarize readers with the scientific study of occupational stress and job satisfaction. It also reviews previous studies involving general dentists and the few reports involving orthodontists. Chapters 2, 3 and 4 are written as independent research papers that are to be submitted for publication in orthodontic journals. Chapter 5 summarizes the results of the project by answering the specific research questions. This chapter also summarized the major conclusions and limitations of the project, and suggests areas for future research that may help broaden our understanding of orthodontists' attitudes towards their careers.

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List of Abbreviations

Abbreviation	Meaning
ABO	American Board of Orthodontists
CAO	Canadian Association of Orthodontists
DSS	Dentists Satisfaction Survey
FRCD(C)	Follow of the Royal College of Dentists of Canada
JS	Job satisfaction
OH	Oral hygiene
OS	Occupational stress
RCD(C)	Royal College of Dentists of Canada
SD	Standard deviation

Chapter One

Introduction and Literature Review

1.1 - "Stress"

Researchers have studied stress for over 65 years. For readers unfamiliar with the basic concepts and definitions, a brief review of the scientific approach to stress research will be presented.

In 1936, Dr. Hans Selye published a short paper entitled "*A syndrome produced by diverse nocuous agents.*"(1) He described that experimentally exposing rats to a variety of non-specific agents (including cold, surgical injury, excessive muscular exercise and pharmacological injection) all produced a similar response. In each case, three types of changes were produced: **1)** enlargement of the adrenal cortex, **2)** shrinkage of lymphatic structures and **3)** ulceration of the stomach lining. He termed the response the General Adaptation Syndrome (GAS). From these beginnings, an important field of research has grown to investigate how we interact with our surroundings.

Seyle continued his work to develop the GAS throughout his career.(2) He later described the GAS as having three progressive stages: the alarm reaction, the stage of resistance and the stage of exhaustion.(2) Each stage is characterized by a set of physiological manifestations. The alarm reaction is the body's initial response to an external stimulus. The adrenal cortex releases adrenaline and glucocorticoids, which help the body respond and adjust to the stimulus. If the stimulus continues, the body may find ways to adapt to the stimulus and enter the phase of resistance. These adaptations may not be congruent with long-term survival. When the body's stored resources are depleted, the body may enter the stage of exhaustion. Breakdown of the body's systems

may occur. The function of some of these systems may never return to the original levels, even following removal of the stimulus.

An important feature of the GAS is the non-specificity of the stimulus. A somatic stimulus, such as cold or tissue damage, will produce some of the same physiologic responses as an emotional stimulus, such as fear, joy or surprise. Within the construct of the GAS, the nature of the stimulus, whether positive or negative, somatic or emotional, almost becomes irrelevant. Because of this, Selye defined the term "stress" as the non-specific **result** of any demand upon the body. The stimulus for the response was termed a "stressor." "Distress" was considered to be the body's response to negative, damaging stressors, while "eustress" was a response to positive, fulfilling stressors.

With constant exposure to environmental stimuli, we are continually subjected to potential stressors. The field of stress research expanded as moderating factors affecting the stress response were analyzed. With time, the relatively simple model of the GAS became complicated with many intervening variables.(3) For instance, perhaps the most important issue in human stress research is the influence of our interpretation of the situation. The importance of our cognitive appraisal of the potential stressor was strongly emphasized by Lazarus.(4) In a sense, his approach is the opposite of the GAS; the focus lies not in the body's response, but in the mind's eye.

The differences in Selye's and Lazarus' theories are examples of how the field of stress research has diversified. Researchers have focused on many aspects of stress including the psychological processes, physiological processes, neurochemical processes, coping with stress, stress induced illness, assessment of stressful life events and beneficial stress.

With so many different theories and concepts of stress, there are naturally many different definitions of "stress". The frequent discussion of stress in everyday life also makes the definition of "stress" difficult. "Stress" implies many different phenomena depending on the context of its usage. In contrast to Selye's original definitions, "stress" usually carries negative connotations. Despite the difficulty in defining stress, according to Haan, "we all understand the commonsense meaning of stress in our daily lives."(3) A broad definition of "stress" was presented by Goldberger and Breznitz who described stress as "all that is unpleasant, noxious, or excessively demanding."(5)

1.2 - Occupational Stress and Job Satisfaction

Among the many fields of stress research that have developed is the study of stress in the workplace. The study of occupational stress stems from the proposition that some aspects of many kinds of work have bad effects on most people under certain circumstances.(3)

In 1970, the United States government created the National Institute of Occupational Safety and Health (NIOSH). This agency is responsible for conducting and funding the research for industrial health and safety standards. The NIOSH's support for research lead to great progress in the field of occupational stress beginning in the 1970's.(3)

One incentive for studying occupational stress is the economic impact of stress-related illness in the workplace. Although impossible to accurately measure, estimates of the annual economic loss due to stress-related illnesses are in the billions of dollars.(6,7)

Understanding occupational stress and how to help employees manage stress should have many benefits to an employer.

Stressors in the work place can be divided into two main categories: objectively defined and subjectively defined.(3) Objectively defined stressors are environmental factors such as noise, time variables, pay and changes in the job. Subjectively defined stressors involve the persons' perception of their position. These include responsibility, role definition, relationships at work, person-environment fit and job security.

Many outcomes of occupational stress have been investigated. These can be divided into physiological, psychological and behavioral responses.(3) Some physiological responses include heart rate, blood pressure, disturbed sleep, peptic ulcers, headaches and total rate of illness. Psychological outcomes of occupational stress include self-esteem, boredom, fatigue, depression, chemical dependence and burnout. Behavioural outcomes of occupational stress may include absenteeism, counterproductive behaviours, violence, drug use, work errors and even suicide.

Job satisfaction is intimately related with occupational stress and has also received a great deal of interest from researchers. Locke has defined the concept of job satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences."(8) Satisfaction with work can be classified as one of the psychological outcomes of low occupational stress.(3)

An incentive for the study of job satisfaction was the assumption that increasing employee satisfaction would increase productivity. Although this assumption may not be correct (9), job satisfaction is still an important issue. Job satisfaction is directly related to overall life satisfaction, physical health and mental health.(10)

Two issues regarding job satisfaction can be studied: overall job satisfaction and facets of job satisfaction. Overall job satisfaction is an individual's combined appraisal of all aspects of the job. Facets of job satisfaction are individual aspects or components of the job. For example, the first widely studied job satisfaction survey, the Job Description Index, examined five facets of job satisfaction; work, pay, promotion, supervision and co-workers.(9) The facets of job satisfaction combine to form overall job satisfaction. Overall job satisfaction combines with other areas of life to form overall life satisfaction. Research has also shown that general satisfactions can be moderating factors of more specific satisfactions. For instance, overall life satisfaction can affect general job satisfaction.

Measuring job satisfaction involves problems common to the measurement of any attitude. The basic difficulty is establishing validity in the absence of direct measures of an attitude that can serve as acceptable standards.(9) Research has shown that it is seldom possible to specify which behaviours should arise as a consequence of a particular attitude.(9) There is no reliable way to measure an attitude without relying on the honesty of the person's response. Because of this dilemma, most attitude research is undertaken with the assumption that attitudes are measurable qualities that can be quantified through self-reports from the individual.

1.3 - Occupational Stress Research in General Dentistry

Very few occupational stress studies have involved an orthodontic cohort. A review of the literature involving general dentistry allows the reader to become familiar with the study methods used in a field similar to orthodontics.

The occupational stress associated with general dentistry has been previously researched, and with good reason. Dentists often report, and research has consistently shown, that their job is stressful.(11) It has been suggested that dentistry may actually be the most stressful health care profession and one of the most stressful of all professions.(6,12) A recent study of dentists who had chosen to leave the profession found that 50 of the 237 respondents (21%) reported *stress/burnout* as their main reason for changing careers.(13) This response was second only to *other opportunities* (23%), but ahead of *financial reasons* (16%), *boredom/change* (16%) and *didn't like it* (10%). The problem of stress in dentistry is common enough that many dental associations, including the Ontario Dental Association, the British Columbia College of Dental Surgeons and the Alberta Dental Association, have established confidential collegial assistance programs to counsel dentists in distress.(14,15)

Studies investigating stress-related illness provide more evidence for the importance of evaluating stress in dentistry. Although most of the studies in this field of research are not recent, they do describe the effect of stress on the health of dental professionals. In 1962, Russek published a study as part of an effort to determine risk factors for coronary artery disease.(16) He surveyed 1,100 dentists from four different areas of practice: periodontics, orthodontics, oral surgery and general dentistry. These clinical areas were ranked from least to most stressful by a judging panel comprised of 7 dentists. The prevalence of coronary heart disease increased with the judges' assessment of occupational stress. The most stressful areas of practice, general dentistry and oral surgery, had a higher prevalence of reported illness than the least stressful area of practice, periodontics. Orthodontics was intermediate in prevalence of coronary heart

disease and judged amount of stress. A 1977 study showed a high prevalence of hypertension in a sample of dentists.(17) Twenty-seven percent of 856 dentists at a dental association meeting had diastolic blood pressure readings greater that 90 mm Hg. Suicide, sometimes considered a product of excess stress, has been reported to be over twice as common among dentists than the general population.(18) Although recent reviews on the topic refute this claim, lay people and the media continue to portray dentists as suicide prone.(19)

An interesting study was recently completed by Reitemeier to measure physiologic responses during the practice of dentistry.(20) Electrocardiograms were recorded on 24 dentists, each for a total of 3 working days. The mean increase in pulse rate during clinical practice was 16 beats per minute over resting measures. The procedure causing the highest increase in pulse rate for every subject was dental extractions. During extractions the mean increase in pulse rate was 74 beats per minute and the mean absolute pulse rate was 153 beats per minute. The author classified these responses as ranging from light to moderately severe. This study demonstrates the physiological consequences of stress in dentistry.

The most commonly used method to identify stressful aspects of dentistry is the self-administered survey. A review of the literature found that almost all of the reported studies used this method.(21-34) Only two studies used an alternate method; the previously described study by Reitemeier (20) and a report by Humphris and Cooper.(35) The later study used semi-structured interviews of 10 dental practitioners to evaluate occupational stress. Self-administered surveys do introduce some sources of error. These include social desirability bias, acquiescence response set, and non-response

error.(36) These biases and errors require all surveys to be well-constructed and carefully worded.(36) Unfortunately, some of the errors associated with self-administered surveys are unavoidable. These surveys rely on the respondents' memory and interpretation of the item, which may or may not indicate the physiological response. As well, answers may depend on the mood of the respondent at the time they complete the survey. After a "bad day" in practice, the respondent may report the occupation to be more stressful. There are, however, many advantages to self-administered surveys, especially when distributed by mail. They are generally cheaper than other methods of data collection, respondents may be more honest if anonymity is assured, interviewer bias is eliminated, greater numbers of subjects can be included and respondents can answer the survey at their own pace, taking time to consider the items if necessary.(36)

Despite the limitations inherent in the use of self-administered surveys, interesting information has been found through these types of studies. Unfortunately, few of these studies have been completed in recent years. It is however, worthwhile to review the methods and results of some of the larger studies that have been reported. One of the earliest studies to try to identify the most stressful aspect of dentistry was reported in 1978 by Cooper et al.(22) One hundred fifty participants at a dental conference in California completed a survey containing a list of 15 potential stressors. Respondents were asked to rate each item on a scale from 1 (*causes no pressure at all*) to 6 (*causes a high degree of pressure*). The items used, the mean scores and standard deviations are presented in Table 1.1.

Table 1.1 Potential stressors and mean score using a scale form 1 to 6 as reported by Cooper et al., 1978.(22)

Potential stressor	*Mean score*	*Standard deviation*
Coping with a difficult patient	4.35	1.24
Trying to keep to a schedule	3.83	1.31
Too much work	3.28	1.35
Unsatisfactory auxiliary help	3.13	1.51
Administrative duties	3.07	1.28
Inability to meet own expectations	2.93	1.40
Organizing and interacting with the staff	2.88	1.35
Patients' perception of the dentist as an inflictor of pain	2.85	1.44
Trying to earn a living suitable to lifestyle	2.85	1.47
Attempting to sustain and build a practice	2.73	1.40
Low patient appreciation	2.57	1.25
Difficult physical working conditions	2.46	1.35
Job interfering with personal life	2.36	1.33
Interaction with patients	2.28	1.13
Coping with the routine and dull work associated with the practice	2.17	1.19

N=150

A very similar study, but with a much larger sample size, was reported in 1984 by O'Shea et al.(24) Again, the subjects were participants at a dental conference. The survey presented 25 potential stressors that the respondents were asked to rate on a 4-point scale (*not at all, a little, a fair amount, very much*). In this study, 977 responses were received. The results as reported are presented in Table 1.2. Individual variation in the perceived stress of each item was evident. In fact, each of the 25 items was described as being *very much* stressful by at least one of the respondents. This emphasizes the importance of personality and interpretation of the situation on reports of occupational stress. The authors also report that 75% of the respondents felt that dentistry was *more stressful* than other occupations.

Table 1.2 Dentists' evaluations of 25 potential stressors as reported by O'Shea et al., 1984.(24)

Potential stressor	*Not at all* %	*A little* %	*A fair amount* %	*Very much* %
Falling behind schedule	13	36	35	16
Striving for technical perfection	10	41	36	13
Causing pain in patients	15	43	30	12
Anxiety in patients	10	50	33	8
Patients late for or missing appointments	15	44	29	12
Patients uncooperative in the chair	16	46	26	13
Physical demands of practice	22	44	27	8
Having to train new assistants	28	38	25	9
Insurance company requirements	24	43	27	6
Government regulation	26	43	22	9
Feeling responsible for patients oral health	27	44	22	7
Patients not complying with advice	18	55	22	4
Having to contain your own emotional reactions	23	51	20	6
Having too few patients	42	33	17	8
Unrealistic patient expectations	24	54	19	4
Having too many patients	45	33	18	4
Not making enough money	40	39	16	5
Long working hours	42	38	16	4
Getting along with staff	33	50	13	4
Getting along with patients	36	47	14	3
Lack of patient appreciation	28	56	14	2
Patients not accepting the preferred treatment	34	50	13	2
Too much of same kind of work	49	38	11	2
Competition from other dentists	54	36	9	1
Isolation from other dentists	68	26	5	1

N=977

The most extensive survey to evaluate potential stressors in dentistry was reported in 1994 by Bourassa and Baylard.(30) Surveys were mailed to all 2,651 dentists registered with the provincial licensing body in Quebec. The surveys asked for the respondents rating of 52 potential stressors using a 5-point scale. A total of 1,332 usable responses were received. The authors report the 10 items that received mean scores greater than 3.0. These items and their mean scores are presented in Table 1.3.

Table 1.3 Potential stressors and mean scores using a scale from 1 to 5, as reported by Bourassa and Baylard, 1994.(30)

Item	*Mean score*
The patient shows dissatisfaction towards the care he has received	3.66
Giving care to an uncooperative patient	3.46
Being behind schedule	3.41
Proceeding to a difficult unexpected operation	3.27
Assuming a heavy financial burden	3.25
Giving care to very anxious patients	3.23
Treating a complex case with unfavorable prognosis	3.23
Results of a job bringing only little satisfaction	3.23
You have difficulties obtaining good control of office management	3.05
Being overworked	3.01

N=1,332
Note: standard deviations not reported.

The researchers also collected demographic information about the respondents. This allowed the authors to evaluate the affect of various characteristics on reported occupational stress. Lower stress scores for six of the ten most stressful items were significantly correlated with increasing age. This indicates that stress in dentistry decreases with age and experience. The type of practice was also found to significantly effect reports of stress. Lower stress scores for 8 of the 10 stressors were reported by dentists working for a salary, or as professors, administrators or civil servants. Higher stress scores were reported for these 8 items by dentists working on a percentage or having two or more associates. These authors also found a high degree of variations in the responses, emphasizing the importance of personality traits on the response to potential stressors.

Some trends are evident when comparing the methods used by Cooper et al.(22), O'Shea et al.(24) and Bourassa and Baylard.(30) As the knowledge base grew, the number and specificity of the items increased. This improved understanding of the exact nature of the stressors in dental practice. It is still helpful, however, to search for broader

groupings of potential stressors. This indicates which facets of practice can be considered most stressful. A 1987 study by Cooper et al.(25) proposed the following groupings for potential stressors (in no particular order);

- Patient-related stressors
- Job-related stressors
- Income-related stressors
- Staff-related stressors
- Time-related stressors

Patient-related stressors seem to be scored as highly stressful by all of these three studies. "*Coping with difficult patients* " was the most highly scored stressor by Cooper et al.(22) "*Anxiety in patients*", "*Patients late for or missing appointments*" and "*Patients uncooperative in the chair*" were highly scored by O'Shea et al.(24) In the study by Bourassa and Baylard, "*Patient shows dissatisfaction with care received*", "*Giving care to an uncooperative patient*" and "*Giving care to an anxious patient*" were all rated as highly stressful. All of these items could be considered patient–related stressors.

Time-related stressors were also rated as highly stressful by these studies. An item regarding working with a schedule was ranked as one of the top three stressors in each of the studies.

Some job-related stressors also appear to be regarded as highly stressful. These include "*Inability to meet own expectations*"(22), "*Striving for technical perfection*", "*Causing pain in patients*", "*Physical demands of the practice*"(24), "*Proceeding to a difficult unexpected operation*" and "*Treating a complex case with unfavorable prognosis.*" (30)

Both income- and staff-related stressors occur less frequently as highly rated stressors in these studies. However, some items that could fall under these headings do appear.

A criticism of these, and most other, papers attempting to determine the stressful aspects of dentistry, is that they have not collected information about the frequency of the potential stressors. For instance, it is important to know that dissatisfied patients cause stress, but if this occurs very rarely it may not be as concerning as a more frequent stressor, such as causing pain in patients. A recent paper by Moore and Brodsgaard has demonstrated this dilemma.(34) The report investigates dentists' perception of stress in patients. As part of the survey, eleven potential stressors were presented for the respondent to rank in order of intensity of stress and frequency. The items were ranked based on the frequency with which they were reported as either 1st, 2nd or 3rd rank choices. The results as reported by Moore and Brodsgaard are presented in Table 1.4.

Table 1.4 Dentists' rank order of potential stressors, as reported by Moore and Brodsgaard, 2001.(34)

	Intensity		*Frequency*	
Item	*Rank*	*%*	*Rank*	*%*
Running behind schedule/emergencies	1	74.5	1	69.4
Causing pain/unpleasantness	2	41.2	3	32.0
Too heavy work load	3	29.7	2	37.0
Late patients	4	26.8	4	28.7
Anxious patients	5	26.4	8	22.7
Inadequate assistance	6	23.7	9	12.0
Talkative/uncooperative patients	7	22.3	7	23.1
Broken or cancelled appointments	8	17.6	6	24.0
Technical demands for perfection	9	15.3	5	24.1
Patients not opting for ideal treatment	10	10.2	11	7.9
Regulations and government control	11	10	10	9.3

N=216

Although "running behind schedule/emergencies" was ranked 1st by intensity and frequency, some items were ranked differently. "*Anxious patients*" was ranked 5th by intensity, but dropped to 8th when ranked by frequency. "*Technical demands for perfection*" was not ranked very highly for intensity of stress, ranking 9th, but was ranked 5th by frequency.

1.4 - Job Satisfaction Research in General Dentistry

As with occupational stress research, the methods used to study job satisfaction research in general dentistry have changed over time. Early research used single questions to address the issue of job satisfaction.(21,37-40) Later studies used a series of questions to address overall job satisfaction.(25,41-44) More recent studies have also included other items to address specific facets of job satisfaction.(10,26,27,45-52)

Three questions are often used as single items or as part of a multiple item series to assess job satisfaction. Almost all studies use some form of overall item such as "*How satisfied are you with your career choice?*" (40) or "*How do you like practicing dentistry* "(37). Studies suggest that 60%(37) to 90%(41) of dentists report being satisfied or liking the profession. The most recent studies to evaluate job satisfaction using a single item was reported by Lewis et al. in 1993.(50) Of 325 dentists practicing in Dallas, 70% report being "very satisfied" or "extremely satisfied" with their profession, while only 4% report being "not very satisfied" or "very dissatisfied". (Interestingly, these results were remarkably similar to the responses given by physicians who completed a very similar survey.)

Another issue often used to assess job satisfaction is whether a practitioner would choose the same profession over again. A 1970 study on the opinions of 358 dentists in the U.K. found that 46% reported they would choose dentistry again, 33% were undecided and 19% would not choose the same profession.(38) In 1981, Yablon and Rosner surveyed 1,172 dental graduates from Columbia University.(10) They found 61% reported they would choose dentistry again, 21% would select another area within dentistry and 18% would not choose a dental profession. A more recent random national survey of 1,221 U.S. dentists was completed in 1991 by Gerbert et al.(53) They found 50% of the respondents reported that they would again choose dentistry as their profession.

A third issue that is regularly used to gauge job satisfaction is whether a dentist would support or encourage someone to enter the profession. In the previously mentioned study from 1981, Yablon and Rosner found that 66% of respondents would be very happy or moderately happy to have their own child become a dentist.(10) A 1989 survey of 175 dental graduates from the Louisiana State University found that 52% reported they would encourage their child to enter dentistry.(39) The 1991 study by Gerbert et al. found that 54% of the 1,221 respondents would recommend dentistry as a career to a young person.

The most widely used survey instrument to comprehensively evaluate overall job satisfaction and facets of job satisfaction in dentistry is the Dentist Satisfaction Survey (DSS). The DSS was developed by Shugars et al.(49) and has been used in at least four large-scale surveys.(27,48,51,52) The DSS uses 10 items to evaluate overall job satisfaction and another 44 items to measure 11 facets of job satisfaction. The facets

addressed are; *delivery of care, patient relations, perception of income, personal time, practice management, professional environment, professional relations, professional time, staff* and *stress*. An additional six-item *quality of life* scale is used in conjunction with the DSS. Items are constructed as statements of opinion and the subject is asked to respond using a 5-point Likert scale indicating level of agreement (*strongly disagree, disagree, uncertain, agree, strongly agree*). Multiple items are used for each facet to increase reliability, validity and precision. The order of the items is randomized. Approximately half of the items are worded in the positive form and the remainder in the negative form to limit acquiescent response set, the tendency to agree with items regardless of content.

The validity of the DSS was tested with three sub-studies.(49) The first sub-study compared results of the DSS to open-ended questions presented to 95 respondents. In the second sub-study, regional society presidents of the Californian Dental Association identified extremely satisfied and extremely dissatisfied dentists. DSS results of 21 extremely satisfied dentists were compared to 14 extremely dissatisfied dentists. The final test of validity compared results of 38 delegates of the American Dental Association (ADA) to the main study group. The assumption was that delegates of the ADA were more likely to be satisfied with their profession. Results of all three sub-studies provided support for the validity of the DSS.

Shugars et al, used the DSS to evaluate job satisfaction among 408 California dentists in 1989. Using the *overall job satisfaction scale*, they found approximately 50% to score as satisfied, 38% neutral and 12% unsatisfied. Pearson correlation coefficients were used to determine significant correlations between the *overall job satisfaction scale*,

the facets of job satisfaction and the *quality of life scale*. The *overall job satisfaction scale* was significantly ($p<0.01$) correlated with all of the facet scales except *professional relations*. The *overall job satisfaction scale* was most highly correlated to *respect* ($r=0.62$), *perception of income* ($r=0.49$), *delivery of care* ($r=0.49$) and the *quality of life scale* ($r=0.48$). Pearson correlation coefficients were also used to determine correlations between the *overall job satisfaction scale* and scalar variables representing personal characteristics. The *overall job satisfaction scale* was significantly ($p<0.01$) correlated to net income ($r=0.19$) and age ($r=0.15$), but not correlated to number of auxiliaries, hours worked a week in practice or weeks worked a year. T-tests did not reveal any significant differences in the *overall job satisfaction scale* based on practice location, practice type, gender or ADA membership. A stepwise multiple regression analysis was completed to determine how much variation in the *overall job satisfaction scale* could be predicted from the facet scales and the *quality of life scale*. Fifty-nine percent (adjusted $R^2=0.59$) of the variation in the *overall job satisfaction scale* was explained by a model including *respect, stress, delivery of care, perception of income, quality of life scale*, and *patient relations*.

A similar study using the DSS was reported by Logan et al. in 1997.(51) The authors included scales to address six personal values; *achievement, altruism, autonomy, comfort, safety* and *status*. Responses from 119 dentists in Iowa were analyzed. Approximately 60% of the respondents scored as satisfied using the *overall job satisfaction scale*. The authors do not report the number scoring as neutral or dissatisfied. The *overall job satisfaction scale* was significantly correlated to $p<0.01$ with all of the facet scales except *professional relations* and *patient relations*, which were significantly

related to $p<0.05$. The facet scales most highly correlated to the *overall job satisfaction scale* were *respect* ($r=0.65$), *perception of income* ($r=0.55$) and *quality of life scale* ($r=0.42$). A stepwise multiple regression analysis determined a model including *perception of income, patient relations* and *respect* to explain 57% ($R^2=0.57$) of the variation in the *overall job satisfaction scale*. Of the six personal values the authors included in their survey, only *security* was significantly ($r=0.26$, $p<0.01$) related to the *overall job satisfaction scale*.

The most recent survey of dentist job satisfaction to use the DSS was conducted in Kentucky by Wells and Winter in 1999.(52). The author's sought to determine the influence of more personal and practice characteristics on job satisfaction. The reliability of the DSS was tested using the test-retest and co-efficient alpha procedures with a pilot group of 23 dentists. All 1,572 dentists licensed to practice in Kentucky were mailed the survey, of which 987 usable responses were received. Items related to the *quality of life scale* were not included in the survey. The data was analyzed using correlation co-efficient and regression analysis, but the authors do not report the ratio of dentists that could be classified as satisfied using the *overall job satisfaction scale*. The *overall job satisfaction scale* was significantly ($p<0.01$) correlated to all of the facets of job satisfaction, age, weeks worked a year, year of graduation, dental income, household income, and perceived debt burden. Again, the items most highly correlated to the *overall job satisfaction scale* were *respect* ($r=0.65$), *delivery of care* ($r=0.57$) and *perception of income* ($r=0.56$). The regression analysis showed the combination of *respect, perception of income, delivery of care, stress, patient relations* and *professional*

time accounted for 59.6% (adjusted R^2=0.596) of the variation in the *overall job satisfaction scale.*

The results of the correlation analyses completed by Shugars et al.(48), Logan et al.(51) and Wells and Winter(52) are summarized in Table 1.5. The results of the regression analyses reported by these studies are summarized in Table 1.6.

Table 1.5 Reported correlations between facets of job satisfaction and overall job satisfaction..(48,51,52)

Facet of the DSS	*Shugars et al. 1990, N=558 r-value*	*Logan et al. 1997, N=119 r-value*	*Wells and Winter 1999, N=987 r-value*
Delivery of care	0.49**	0.32**	0.57**
Perception of income	0.49**	0.55**	0.56**
Patient relations	0.45**	0.40*	0.46**
Personal time	0.24**	0.29**	0.35**
Practice management	0.34**	0.35**	0.36**
Professional environment	0.30**	0.22*	0.25**
Professional relations	0.12	0.25**	0.22**
Professional time	0.40**	0.26**	0.48**
Respect	0.62**	0.65**	0.65**
Staff	0.26**	0.29**	0.36**
Stress	-0.41**	0.28**	-0.42**
Quality of life scale	0.48**	0.42**	Not reported

* $p<0.05$
** $p<0.01$

Table 1.6 Reported multiple regression analyses for overall job satisfaction.(48,51,52)

Study	R^2	*Components of regression model*
Shugars et al., 1990(48) N=558	0.59	Respect Stress Delivery of care Perception of income Quality of life scale Patient relations
Logan et al., 1997(51) N=119	0.57	Perception of income Patient relations Respect
Wells and Winter, 1999(52) N=987	0.599	Respect Perception of income Delivery of care Stress Patient relations Professional time

1.5 - Occupational Stress and Job Satisfaction Research in Orthodontics

Compared to general dentistry, there is an obvious lack of literature regarding occupational stress and job satisfaction in orthodontists.

As previously described, in 1962 Russek (16) reported that occupational stress in orthodontics was greater than in periodontics, but less than in general dentistry or oral surgery. This was based on the rankings of a judging panel of 7 dentists. No attempt was made to determine the stressful aspects of orthodontics.

Although some of the studies investigating the stressful aspects of dentistry did report the number of specialists in their sample, none report a separate analysis for these respondents.(24,29,39,50)

The only study to evaluate potential stressors and job satisfaction in orthodontics was completed in the United Kingdom by Humphris et al. in 1993.(31) The survey

compared junior dental hospital staff from three different fields: general dentistry, oral surgery and orthodontics. The purpose of the study was to compare occupational stress, health status, job satisfaction and burnout between the three groups of practitioners. Burnout is defined as "a syndrome of emotional exhaustion, depersonalization and reduced personal accomplishment that can occur among individuals who do 'people work' of some kind."(54). The survey included the Occupational Stress Indicator (OSI) and the Maslach Burnout Inventory (MBI). The OSI is a 167-item questionnaire that includes sub-scales for both occupational stress and job satisfaction.(55) It is not profession specific and has been mainly used with mid-level business managers. The MBI is a 22-item survey to assess the three components of burnout: depersonalization, emotional exhaustion and low personal achievement.(54) The surveys were distributed to a total of 53 hospital dental staff. Of the 42 respondents, 11 were orthodontists, 10 were oral surgeons and 21 were restorative dentists. The results showed no significant differences between the three groups on the sources of stress scale of the OSI. The job satisfaction scale of the OSI showed the restorative dentists to report significantly ($p<0.05$) less job satisfaction than the oral surgery or orthodontic specialists. The mean score for orthodontic specialists on the job satisfaction scale of the OSI was 87.1 (possible scores range from 22-132) with a standard deviation of 14.3. The mean scores for oral surgeons was 90.7 (SD = 18.2) while for general dentists it was 75.3 (SD = 11.9). The MBI showed orthodontic specialists to report significantly ($p<0.05$) less depersonalization, and thereby less burnout, than the general dentists or oral surgery specialists. The orthodontic group also seemed to report a greater sense of personal achievement and less emotional exhaustion, however, these differences were not

statistically significant. Four of the respondents were classified by the MBI as suffering from "burnout," however the authors do not report in which cohort these occurred. The authors concluded that differences in long-term effects of occupational stressors were evident between the three groups.

In reviewing the results of the study by Humphris et al.(31), Kaney presents two explanations: the personality of individuals entering orthodontics and the nature of the orthodontic work environment.(56) She proposes, "orthodontic practice provides greater flexibility in the management of patients and the time in which treatment is completed. Furthermore, as the nature of much of this work is elective the patient group may be more co-operative." These factors may influence levels of depersonalization and personal accomplishment, and thereby burnout.

Although the study by Humphris et al.(31) provides some interesting results, the applicability to most orthodontists may be questionable. The respondents were all young (88%, were between 21 and 36 years of age) and based in hospital programs in the United Kingdom. These results may not apply to experienced orthodontists practicing in private clinics in North America. As well, the results were based on responses from a total of only 11 orthodontists.

Prior to our study, no report has adequately evaluated potential stressors in orthodontics to a level that may be helpful to the majority of orthodontic practitioners. As well, the job satisfaction of orthodontic specialists has not been adequately determined.

1.6 - Purpose

One factor in my decision to pursue graduate training in orthodontics was the attitude of orthodontists I had met. All were very enthusiastic about their specialty and seemed to be very happy with their career choice. As I progress through my orthodontic training, I have come to understand some of the many positive aspects of orthodontics. At the same time, I recognize that there are many stressful aspects of orthodontic practice.

The occupational stress and job satisfaction of general dentists has been well documented in the literature. From all estimations, general dentistry seems to be a stressful profession. Detrimental long-term health effects and job dissatisfaction in general dentistry have been described in the literature.

The practice of orthodontics has many similarities to general dentistry. Many of the same stressors occurring in general dentistry are also experienced by practicing orthodontists. As well, orthodontics includes many unique aspects that may act as stressors. The literature, however, lacks adequate reports of stressors in orthodontic practice. The effect of these stressors on the job satisfaction of orthodontists has also not been documented.

The goal of this research project was to thoroughly evaluate potential stressors, overall occupational stress and job satisfaction in practicing orthodontists.

1.7 - Statements of Objectives

1.7.1 - Primary Objectives

Objective #1: To develop a research tool to investigate occupational stress and job satisfaction in orthodontic specialists.

Objective #2: To determine the most stressful aspects of orthodontic practice.

Objective #3: To determine the most frequently occurring stressful aspects of orthodontic practice.

Objective #4: To evaluate how various personal characteristics (*age, gender, marital status, parenthood, years experience, other residency experiences, general dental experience, previous occupational experiences, professional affiliation, continuing education practices, stress management practices*) and practice characteristics (*province of practice, size of practice community, type of practice, number of employees, involvement in academics, satellite offices, hours worked a week, weeks worked a year, gross income*) effect reported occupational stress in orthodontic practice.

Objective #5: To evaluate job satisfaction in orthodontics.

Objective #6: To evaluate how various personal characteristics (*age, gender, marital status, parenthood, years experience, other residency experiences, general dental experience, previous occupational experiences, professional affiliation, continuing education practices, stress management practices*) and practice characteristics (*province of practice, size of practice community, type of practice, number of employees, involvement in academics, satellite offices, hours worked a week, weeks worked a year, gross income*) effect reported job satisfaction in orthodontics.

Objective #7: To evaluate the relationship between various facets of job satisfaction with overall job satisfaction in orthodontics.

Objective #8: To evaluate the relationship between occupational stress and job satisfaction in orthodontics.

1.7.2 - Secondary Objectives

Objective #9: To compare potential stressors in orthodontic practice with reports of potential stressors in general dentistry.

Objective #10: To compare job satisfaction in orthodontists with reports of job satisfaction in general dentists.

1.8 - Research Questions and Hypotheses

#1 – What are the most stressful aspects of orthodontic practice?

#2 – What are the most frequently occurring potential stressors in orthodontic practice?

#3 – What are the most concerning potential stressors in orthodontic practice: those that are stressful and occur frequently?

#4 – Are there statistically significant relationships between overall occupational stress and various personal and practice characteristics of orthodontists?

HO – There are no significant relationships.

HA – There are significant relationships.

#5 – What proportion of orthodontists are satisfied with their profession?

#6 - Are there statistically significant relationships between overall job satisfaction and various facets of job satisfaction among orthodontists?

HO – There are no significant correlations.

HA – There are significant correlations.

#7 – Are there statistically significant relationships between job satisfaction and various personal and practice characteristics among orthodontists?

HO – There are no significant relationships.

HA – There are significant relationships.

#8 - Is there a statistically significant relationship between overall occupational stress and overall job satisfaction among orthodontists?

HO – There is no significant relationship.

HA – There is a significant relationship.

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Chapter Two

Occupational Stress among Orthodontists

2.1 - Introduction

The modern concept of stress has evolved since being introduced by Hans Selye in the 1930's.(1) Stress has recently been defined as "all that is unpleasant, noxious, or excessively demanding."(2) The field of occupational stress (OS) is the study of those aspects of work that either have, or threaten to have bad effects.(3)

Dentistry is usually considered a stressful profession. The stressful aspects of dental practice have been well researched.(4-11) Potential effects of high OS in dentistry have been reported. These include hypertension(12), coronary-artery disease(13), and suicide(14;15). A recent study of dentists who had chosen to leave the profession found that 50 of the 237 respondents (21%) reported *stress/burnout* as their main reason for changing careers.(16)

Some studies describing stressful aspects of dentistry have reported a number of specialists responding to the survey, however, none of these report a separate analysis of the specialists' responses.(17-20) O'Shea et al. reported no difference between general dentists and specialists in response to the question "How much stress do you feel you are under compared with other dentists?"(17)

OS in orthodontics has not been well researched. Only two OS studies have been found that used an orthodontic cohort. A 1962 study evaluated stress as a risk factor of coronary heart disease using groups of four dental professionals.(13) A judging panel, consisting of 7 general practitioners, ranked the four occupations from most stressful to least stressful as follows: general practice, oral surgery, orthodontics and periodontics. A questionnaire regarding cardiovascular disease was sent to 2,251 clinicians randomly

selected from the directory of the American Dental Association. A total of 1,100 usable responses were returned, of which 304 were orthodontists. The prevalence of coronary heart disease was found to be significantly higher in the professions judged to have the highest stress (general practice and oral surgery) than in the profession judged to have the least stress (periodontics). An intermediate prevalence of coronary heart disease was found among the orthodontic respondents.

Recently, a 1997 report by Humphris et al. described a study to evaluate OS in three hospital dental specialties in the United Kingdom.(21) Fifty-two clinicians were invited to participate in the project. A total of 42 responses were received, of which 21 were restorative dentists, 11 were orthodontists and 10 were oral surgeons. The majority of the respondents (88%) were between 21 and 36 years of age. No differences were reported between the three professions in the OS sub-scales of the Occupational Stress Indicator.(22) The authors also evaluated burnout using the Maslach Burnout Inventory.(23) The orthodontic cohort demonstrated less burnout than the oral surgery or restorative groups. Given the low number of respondents, their age and the hospital-based nature of their practice, it is difficult to generalize these results to the majority of orthodontic practitioners.

The objectives of this study were:

1. To determine the most stressful aspects of orthodontic practice;
2. To determine the most frequently occurring stressors in orthodontic practice;
3. To determine the most concerning stressors in orthodontic practice, those with high severity and frequency; and
4. To evaluate how various personal and practice characteristics affect reports of OS.

2.2 - Methods

2.2.1 - Survey Instrument

Twenty-four personal and practice characteristics were addressed in the survey. Other studies had reported most of these items to affect reports of OS or job satisfaction.(3,9,17,24) The characteristics included were; age, gender, marital status, parenthood, years of professional experience, general dental experience, other specialty training, previous occupational experiences, province of practice, population of community, type of practice (solo, partnership, etc.), staffing, satellite offices, part-time academic involvement, hours worked a week, weeks vacation a year, gross income, professional affiliations (membership in the Canadian Association of Orthodontists (CAO), Fellowship in the Royal College of Dentists of Canada (FRCD(C)), diplomate status with the American Board of Orthodontists(ABO)), continuing education practices and stress management practices.

OS in orthodontic practice was evaluated using a list of potential stressors. Approximately half of these items had been reported as being stressful in general dental practice.(5,6,17,25) The remaining items were identified as potential stressors during a focus group meeting with three practicing orthodontists. The focus group participants included both genders and represented a range of practice types, years of experience. A total of 67 potential stressors were included in the survey. The potential stressors were divided into six categories: *income-, patient-, referral-, staff-, time- and work-related stressors*. These categories were based on the classification system introduced by Cooper et al.(4), except for *referral-related* stressors, which was a new category. Respondents were asked how stressful each item was (severity) and how frequently it occurred

(frequency). Severity was scored using a 5-point Likert-type scale with the end points "not stressful" (1) and "very stressful" (5). Frequency was scored using a 5-point scale as follows: N – never, R – rarely, M – monthly, W – weekly, D – daily.

Another item was included to obtain an overall evaluation of OS in orthodontics. The question was worded "Overall, how stressful do you find the practice of orthodontics?" Respondents were asked to use a scale from 0 (not stressful) to 100 (very stressful). This variable was considered the *overall occupational stress score.*

Overall job satisfaction was measured using ten items modified from the Dentist Satisfaction Survey (DSS).(26)

Three practicing orthodontists acted as a test group to evaluate an initial version of the survey. Feedback from the test group was used to make minor revisions prior to the general distribution of the survey. The final version of the survey, as distributed in the general mailing is presented in Appendix B.

2.2.2 - Survey Distribution

In January 2001, provincial regulatory bodies were contacted for listings of the licensed orthodontists in each region. In total, 658 orthodontists were identified, with an additional 8 orthodontists excluded due to their involvement in the construction of the survey.

Each orthodontist was mailed a copy of the survey, an introduction letter (Appendix C), a postage-paid return envelope and a stamped response card (Appendix D). The response card was used to identify respondents while maintaining the anonymity of the surveys. Respondents were instructed to return the response card separately form

the survey. As an incentive to reply, orthodontists could request a copy of the results of the project using the response card.

One month following the general mailing, 15 mail-outs had been returned because of an incorrect address. A current address could be found for 11 of these individuals and the mail-outs were re-distributed along with a note explaining the delay. A total of 654 orthodontists thereby received the survey.

Reminder cards were sent to individuals who had not returned a response card (Appendix E). These were distributed approximately 6 weeks following the initial mailing.

2.2.3 - Data Analysis

The survey was coded and data was entered into Microsoft Excel 2000 (Microsoft Corp., Redmond, WA). Data was analyzed using Excel 2000 and SPSS 10.0 for Windows (SPSS Inc., Chicago, IL). A third party established the rate of data entry errors by manually checking 20% of the returned surveys. The surveys chosen for review were selected by a random number generation function. In keeping with previously published papers, ordinal data was analyzed with interval statistical methods.

Evaluation of potential stressors

Mean severity scores of each item were calculated to determine the most stressful aspects of orthodontic practice. Frequency scores were transformed to a numerical scale as follows: never – 1, rarely – 2, monthly – 3, weekly – 4, daily – 5. The *mean frequency score* of each item was calculated to determine the most frequently occurring stressors in

orthodontic practice. The most concerning stressors were those items with *mean severity* and *mean frequency scores* equal to or greater than 3.0.

The *mean category score* for each of the six stressor categories was calculated using the severity scale. Paired t-tests were used to determine significant differences between the categories.

Factors affecting occupational stress

The individual effect of personal and practice characteristics on the *overall occupational stress score* was determined. Independent sample t-tests were used for characteristics represented by nominal variables. One-way ANOVA with Tukey post hoc comparisons were used for categorical variables and two-tailed Pearson correlation coefficients were used for scalar variables.

In preparation for multiple regression analysis, categorical variables were either transformed to a linear scale (*number of children, population of community, gross income*) or assigned indicator variables (*marital status, province, practice type*).

The *overall occupational stress score* was used as the dependant variable in a stepwise multiple regression analysis. All personal and practice characteristics, as well as *overall job satisfaction* were included as independent variables.

2.3 - Results

A total of 335 responses were received for a final response rate of 51.2%. Respondents who indicated that they were not currently practicing orthodontics were excluded from the analysis. Because of this, the total number of usable responses was

319. A summary of selected characteristics of the respondents is presented in Table 2.1. Comprehensive data describing the characteristics of the survey respondents is presented in Appendix F.

Thirteen data entry errors were found in 14,656 data points for a rate of 0.089%. The remaining 80% of the surveys were not checked due to this low data entry error rate.

Evaluation of potential stressors

A wide range of responses to the potential stressors was found. Each of the 67 items had a range of severity scores from 1 to 5. The most stressful aspects of orthodontic practice, based on mean *severity scores*, are presented in Table 2.2. The most frequent stressors in orthodontic practice, based on mean *frequency scores*, are presented in Table 2.3. Five items had mean *severity* and *frequency scores* equal to or greater than 3.0. These items were considered the most concerning stressors in orthodontic practice and are presented in Table 2.4.

Mean category scores for the six categories of stressors are presented in Table 2.5. The category with the highest mean score was *time-related* stressors. Paired t-tests showed this category score to be significantly ($p<0.01$) higher than all of the other category scores. No statistically significant difference was found between the next highest categories: *staff-* and *patient-related* stressors. Also, no significant difference was found between the two categories with the lowest scores: *income-* and *referral-related* stressors. Differences between the categories were small compared to the variance within the categories.

Mean *severity score*, mean *frequency score* and category for all 67 potential stressors are presented in Appendix G.

Factors affecting occupational stress

Overall occupational stress scores ranged from 0 to 99 with a mean of 49.3 (SD 25.5). (Fig 2.1)

Individual analysis revealed seven characteristics with significant effects on overall occupational stress scores (Table 2.6). Three of these characteristics were positively related to reports of OS: part-time academics, hours worked a week and participation in a study-club. The remaining characteristics were negatively associated with reported OS: age, years of practice, weeks of vacation a year and reported overall job satisfaction.

Stepwise multiple regression analysis reveled a seven-component model to predict 35.9% of the variation in overall occupational stress scores (Table 2.7).

The factors affecting overall occupational stress were also evaluated using two other dependant variables: *mean severity score* of the 67 items and the *severity score mode*. Results of these multiple regression analyses are presented in Appendix H. Results of multiple regression analyses using the categories of occupational stress are presented in Appendix I.

2.4 - Discussion

Over half of the orthodontists in Canada responded to the survey. The descriptive data indicates that a broad spectrum of practice and personal characteristics were

represented. The response rate from Quebec (57/129 or 44.2%) was mildly lower than the national average, despite the survey having not been translated into French. Therefore, it is reasonable to assume that the results from this sample are representative of orthodontists practicing in Canada.

Analysis of the potential stressors was completed based on mean scores. This is the most common the method used in other occupational stress surveys despite the fact that data was collected as ordinal variables. This analysis revealed 24 items that received a mean severity score of 3.0 or greater. This is substantially greater than the number reported by Bourassa and Baylard(5) following a survey of dentists using the same scale and a similar number of items. They reported 10 items with mean severity scores of 3.0 or greater. This difference should be expected as the items used in our survey were drawn from lists of highly rated stressors in four other studies.(5,6,17,25)

Many similarities are seen between our results and those reported for dentistry. The three most highly scored stressors, "*The patient shows dissatisfaction with the care received*", "*Performing clinical tasks on a difficult or uncooperative patient*" and "*Falling behind schedule*", were almost identical to the three most highly scored stressors reported by Bourassa and Baylard(5): "*The patient shows dissatisfaction with the care he has received*", "*Giving care to an uncooperative patient*" and "*Being behind schedule.*" These three issues are also among the most highly ranked in other studies.(6,17). Other stressors that are similar in orthodontics and dentistry are: staffing issues, idealism, patient's missing appointments, financial burdens and being overworked.

Some issues often reported as being stressful in general dentistry were not found to be highly stressful in an orthodontic population. These include "*Causing pain in patients*" and "*Proceeding to a difficult, unexpected operation*".

Many more issues, however, were scored as highly stressful in the orthodontic population that have not appeared frequently in dental studies. These include: "*Dealing with unrealistic patient expectations*", "*Relapse in retention patients*", "*Pressure to debond from patient and/or patient*", "*General practitioners questioning case management*", "*Managing 'burnt-out' patients*" and "*Motivating patients with poor OH and/or decalcification.*" This should not be interpreted as indicating that these are more stressors in orthodontics than dentistry. This survey was constructed for the orthodontic population and included many items specific to the orthodontic profession.

Most of the highly scored stressors received low *frequency scores*. The *frequency score* for the most stressful item, "*The patient shows dissatisfaction with the care received*", was only 1.99 (SD=0.41), ranking this item 62 out of 67 based on frequency. Similarly, most of the frequent stressors had low severity scores. The most frequent stressor, "*Managing adult patients*" had a mean *severity score* of 2.50 (SD=0.96), ranking 47 out of 67. "*Patients being late for or missing adjustment appointments*" had a mean *severity score* of 2.71 (SD=1.09), ranking 34 out of 67.

The importance of considering the frequency of a stressor should be emphasized. The body may be able to cope with high severity, low duration stressors better than it can cope with low severity, high frequency stressors.

Only five items received mean *severity* and *frequency scores* of 3.0 or greater and were considered the most concerning stressors in orthodontic practice. This definition

was chosen as these items should be considered stressful by most orthodontists and should occur more frequently than once a month. An issue considered one of the most concerning aspects of orthodontic practice is "*Motivating patients with poor OH and/or decalcification.*" This issue emphasizes the importance of patients' cooperation during their treatment. Also, it shows the orthodontists desire to improve their patients' smiles, rather than accept undesirable consequences of poor hygiene during treatment.

Four of the most concerning stressors are time-management issues. Treating "*patients with broken appliances*" causes "*time pressures*" that interferes with "*trying to keep to a schedule,*" causing clinicians to "*fall behind schedule.*"

Mean *category scores* for the six classes of orthodontic stressors also show the importance of time-management in orthodontics. Although the differences between the groups were small, stressors categorized as time-related had higher mean severity scores. The results suggest that clinicians interested in decreasing occupational stress should first consider ways to improve their time-management skills.

An issue that must be considered when reviewing the results of this survey is the amount of variation in the responses. Pronounced differences were seen in response to the severity of the 67 potential stressors. Each item was scored as "very stressful" by at least one orthodontist, and as "not stressful" by at least one other. In most cases, the variance within responses to an item is smaller than the differences between items. This variance is to be expected based on current stress research. Personality and individual differences are known to have important influences on the stress response.(2) The *severity score* standard deviations in this study are similar to those reported in other studies of dental stressors.(25) Perhaps the influence of personality and individual

differences is most evident in *overall occupational stress scores*. The range of responses nearly spanned the full 100-point scale of the question and the standard deviation was over a quarter of the response scale.

Analysis of personal and practice characteristics attempted to explain some of the variation in *overall occupational stress scores*. Individual analyses identified several factors with significant effects on overall occupational stress. Age, years of experience, and hours worked a week were significantly related to *overall occupational stress*. These characteristics have also been reported to affect reports of OS in dentistry.(5,17,24) The reported correlation coefficients between these characteristics and reports of OS in dentistry are remarkably similar to what was found in orthodontics.

The strongest correlation was between *overall occupational stress* and *overall job satisfaction*. This correlation has also been previously reported in the dental literature.(24,27,28)

Two factors significantly related to *overall occupational stress scores* had not been previously reported; part-time academics and participation in a study-club. These items, however, were not included in the previous studies.

Evidence of part-time academics and participation in a study-club being related to reported OS is also found in the multiple regression analysis. Both of these items, as well as age, hours worked a week and *overall job satisfaction* were included in the final regression model. Increased days of continuing education was also associated with a decreased report of occupational stress. Interestingly, participation in stress management was associated with increased reports of occupational stress. It is reasonable to assume

that these individuals were more aware of stress and therefore more likely to be taking steps to manage stress.

Overall, the final regression model was only able to account for 35.9% of the variation in the *overall occupational stress scores*. Therefore, *overall occupational stress* is influenced more by personality and other factors then the combined effects of the characteristics identified in this survey.

2.5 – Conclusions

- Large variation is found in the evaluation of potential stressors and overall occupational stress in orthodontics.
- The most concerning stressors in orthodontics, based on high severity and frequency of occurrence, involve time-management and patient cooperation.
- The stressors in orthodontic practice are similar to those in dentistry, but some stressors unique to the orthodontic profession do exist.
- Multiple regression analysis identified a model including overall job satisfaction, age, participation in a study-group, hours worked a week, part-time academics, days of continuing education a year and participation in stress-management to account for 35.9% of the variation in reported OS.
- Other factors, including personality, seem to have a greater effect on reported OS than the characteristics evaluated by this survey.

2.6 – Chapter 2 Tables and Figures

Table 2.1 Key descriptive data of survey respondents.

Characteristic	*n*	
Age	313	Mean - 47.7 years SD - 10.4 years
Gender		
Male	269	84.3 %
Female	49	15.4 %
	318	
Years practicing orthodontics	318	Mean - 16.6 years SD - 10.4 years
Province of primary practice		
British Columbia	59	19.3 %
Alberta	32	10.5 %
Saskatchewan	9	2.9 %
Manitoba	12	3.9 %
Ontario	125	40.8 %
Quebec	52	17.0 %
New Brunswick	8	2.6 %
Prince Edward Island	1	.3 %
Nova Scotia	6	2.0 %
Newfoundland	2	.7 %
	306	
Primary type of practice		
Solo Practice	206	65.0 %
Associateship – associate	22	6.9 %
Associateship – practice owner	22	6.9 %
Partnership	41	12.9 %
Group Practice	18	5.7 %
Academic	8	2.5 %
	317	
Part-time academics		
No	231	74.3 %
Yes	80	25.7 %
	311	

Total *n* varies due to non-responses. Maximum total *n* was 319

Table 2.2. Rank order of potential stressors based on mean severity score.

Ranking	*Possible Stressor*	*Mean severity score*	*S.D.*
1	The patient shows dissatisfaction with the care received.	3.82	1.34
2	Performing clinical tasks on a difficult or uncooperative patient.	3.75	1.04
3	Falling behind schedule.	3.56	1.05
4	Dealing with unrealistic patient expectations.	3.40	1.13
5	Medical-legal cases.	3.37	1.47
6	Dealing with complaints from staff.	3.35	1.21
7	Trying to keep to a schedule.	3.33	1.09
8	Inability to meet my own expectations.	3.32	1.17
9	Patients being late for or missing banding/bonding appointments.	3.31	1.17
10	Constant time pressures.	3.31	1.18
11	Relapse in retention patients.	3.28	1.00
12	Treating a case with an unfavorable prognosis.	3.26	1.14
13	Accepting compromised treatment results	3.21	1.02
14	Assuming a heavy financial burden.	3.21	1.33
15	Being overworked.	3.19	1.21
16	Pressure to debond from patient and/or parent.	3.17	1.09
17	General practitioners questioning case management.	3.11	1.21
18	Having to train new assistants.	3.11	1.20
19	Managing "burnt-out" patients.	3.08	1.01
20	Patients with broken appliances.	3.05	1.03
21	Too much work.	3.05	1.19
22	Motivating patients with poor OH and/or decalicification.	3.04	0.99
23	Patients or parents questioning expertise.	3.00	1.32
24	Managing disagreements with partners.*	3.00	1.42

* solo practitioners excluded, n= 95
Otherwise, n=293 to 318
Scale from 1 (not stressful) to 5 (very stressful)
Only those with mean severity score greater than or equal to 3.00 are presented.

Table 2.3 Rank order of potential stressors based on mean frequency score.

Ranking	*Possible Stressor*	*Mean frequency score*	*S.D.*
1	Managing adult patients.	4.17	1.07
2	Patients being late for or missing adjustment appointments.	4.09	1.07
3	Motivating patients with poor elastic and/or headgear compliance.	4.09	0.99
4	Frequent decision making.	4.05	1.34
5	Trying to keep to a schedule.	4.00	1.23
6	Managing paperwork.	3.88	1.34
7	Constant time pressures.	3.84	1.33
8	Patients with broken appliances.	3.79	0.97
9	Motivating patients with poor OH and/or decalicification.	3.76	1.04
10	High concentration levels.	3.53	1.43
11	Quoting and collecting fees.	3.53	1.38
12	Falling behind schedule.	3.36	1.14
13	Maintaining good communication with general dentists.	3.26	1.14
14	Realizing that your treatments are not permanent.	3.21	1.13
15	Emergency patients.	3.20	1.18
16	Maintaining good communication with other specialists.	3.15	1.18
17	Organizing and interacting with the staff.	3.12	1.40
18	Administrative duties.	3.09	1.30
19	Maintaining good relations with good referral sources.	3.08	1.09
20	Physical demands of the practice.	3.06	1.34

n=289 to 318
Scale from 1 (never) to 5 (daily)
Only those with mean frequency score greater than or equal to 3.00 are presented.

Table 2.4. Most concerning stressors in orthodontics.
Stressors with mean severity and mean frequency scores equal to or greater than 3.0.

Possible Stressor	*Mean severity score*	*Mean frequency score*
Falling behind schedule.	3.56	3.36
Trying to keep to a schedule.	3.33	4.00
Constant time pressures.	3.31	3.84
Patients with broken appliances.	3.05	3.79
Motivating patients with poor OH and/or decalicification.	3.04	3.76

n=305 to 310

Table 2.5 Mean category scores for the six categories of stressors.

Stressor category	*# of items in category*	*Mean severity score*	*S.D.*
Time-related	7	3.08	0.86
Staff-related	8	2.86	0.89
Patient-related	17	2.80	0.67
Work-related	19	2.74	0.66
Income –related	10	2.56	0.78
Referral-related	6	2.55	0.76

N=319

Scale from 1 (not stressful) to 5 (very stressful).

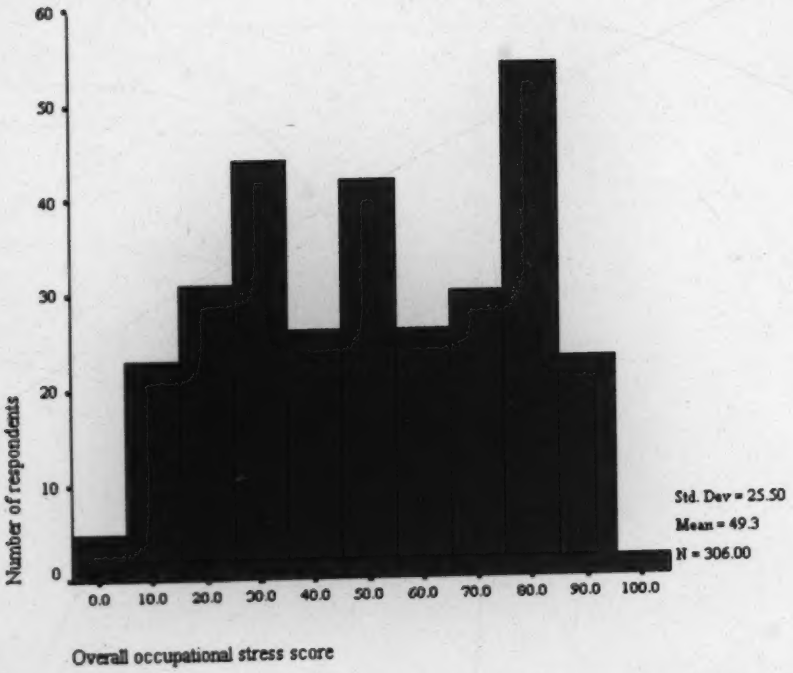

Figure 2.1 Histogram showing distribution of overall occupational stress scores. Scale from 0 to 100.

Table 2.6. Analyses of individual characteristics related to o*verall occupational stress scores.*

Characteristic	*Nature of relation*	*Test*	*p-value*
Age	-	Pearson correlation (r=-0.19)	0.001
Years of practice	-	Pearson correlation (r=-0.16)	0.004
Part-time academics	+	T-test (mean difference=-6.75)	0.044
Hours worked a week	+	Pearson correlation (r=0.18)	0.001
Weeks of vacation a year	-	Pearson correlation (r=-0.15)	0.007
Participation in a study-club	+	T-test (mean difference=-6.75)	0.020
Overall job satisfaction	-	Pearson correlation (r=-0.39)	0.000

Table 2.7. Stepwise multiple regression for *overall occupational stress scores.*

Characteristic added to model	*Nature of relation*	*p-value*
Overall job satisfaction	-	.000
Age	-	.000
Participation in a study-club	+	.001
Hours worked a week	+	.005
Part-time academics	+	.008
Days of continuing education a year	-	.007
Participation in stress management	+	.027

Overall $R^2 = 0.359$

2.7 – Bibliography

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Chapter Three

Job Satisfaction among Orthodontists

3.1 - Introduction

Satisfaction with one's life is a universal goal. One component of our feelings about our lives is our attitudes towards our work. Job satisfaction (JS) has been defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences."(1) Studying JS is important because of reported influences on individuals' physical and mental well-being and because of possible effects on job-related behaviours and performance.(2)

The difficulties associated with measuring JS are similar to those experienced when describing any attitude. The main problem is in establishing validity of the measure in the absence of direct measures of the attitude.(3) The validity of an instrument to measure an attitude can only be assumed following comparison to established attitude theory and other measurement methods.

The most widely reported comprehensive instrument used to evaluate JS in dentistry is the Dentist Satisfaction Survey (DSS). The DSS was developed and tested for validity by Shugars and associates.(4) To date, the DSS has been used in at least four dental surveys(5-8). The DSS uses ten items to evaluate *overall job satisfaction*. An additional 44 items are used to measure eleven facets of JS. The facets included are: *delivery of care, patient relations, perception of income, personal time, practice management, professional environment, professional relations, professional time, respect, staff* and *stress*. An additional six-item *overall quality of life* scale is used in conjunction with the DSS.

Other studies have indirectly evaluated JS in dentistry using single questions such as; "*If given the chance, would you choose dentistry again?*"(9-13) or "*If you child were considering dentistry as a career, would you encourage him/her?*"(10)

Many studies have evaluated JS in dentistry, but JS in orthodontics has not been adequately reported. Only one study has described JS in a sample of orthodontists. Humphris et al.(14) compared three hospital-based dental fields using the Occupational Stress Indicator, which includes a 22-item *job satisfaction scale.* The results showed restorative dentists to be significantly less satisfied than oral surgeons and orthodontists. The same differences were seen on three of the five *job satisfaction sub-scales*: *organizational processes*, *achievement* and *satisfaction with the job itself.* No differences were reported in the *status* and *personal relationships sub-scales*. Caution should be used when generalizing the results of this study due to: the small sample size (total n=42, orthodontist n=11), the age of the respondents (88% between 21 and 36 years of age) and the hospital-based nature of their practices.

The objectives of this study were:

1. To measure overall JS in a group of orthodontists;
2. To measure orthodontists' satisfaction with specific facets of practice;
3. To evaluate how various personal and practice characteristics influence reports of overall JS.

3.2 - Methods

3.2.1 - Survey Instrument

The survey included items addressing the personal and practice characteristics of the respondents. Most of these characteristics had been reported to affect JS or occupational stress in general dentistry or other professions.(8,15-17) The characteristics addressed were; age, gender, marital status, parenthood, years of professional experience, general dental experience, other specialty training, previous occupational experiences, province of practice, population of community, type of practice (solo, partnership, etc.), staffing, satellite offices, part-time academic involvement, hours worked a week, weeks vacation a year, gross income, professional affiliations (Membership in the Canadian Association of Orthodontists (CAO), Fellowship in the Royal College of Dentists of Canada (FRCD(C)), diplomate status with the American Board of Orthodontists(ABO)), continuing education practices and stress management practices.

The survey evaluated JS using a modified version of the Dentists Satisfaction Survey.(5) Some items were re-worded to apply to the orthodontic practitioner. In total, 58 items were used. For each item, the respondent was asked to indicate their level of agreement using a 5-point Likert-type scale: *strongly disagree=SD, disagree=D, neither agree nor disagree=N, agree=A, strongly agree=SA.*

The survey evaluated overall occupational stress with the question: "Overall, how stressful do you find the practice of orthodontics?" A scale from 0 (not stressful) to 100 (very stressful) was used. This was defined as the *overall occupational stress score.*

An initial version of the survey was distributed to three practicing orthodontists who acted as a test group. Minor revisions were made based on feedback from the test

group. The final version of the survey, as distributed in the general mailing is, presented in Appendix B.

3.2.2 - Survey Distribution

Listings of orthodontists licensed in Canada were collected from provincial regulatory bodies in January of 2001. Eight orthodontists were excluded due to their involvement in the construction of the survey. The remaining 658 orthodontists formed the study population.

The surveys were distributed along with an introduction letter (Appendix C), a postage-paid return envelope and a stamped response card (Appendix D). The response card was intended to be returned separately from the survey. This provided a record of who had returned the survey, while the surveys remained anonymous. The response card also allowed the respondent to request a copy of the results: acting as an incentive to return the survey.

Fifteen mail-outs were returned because the initial address was not current. An updated address was found for 11 of these and they were re-distributed. The total number of orthodontists who received the survey was therefore 654.

Approximately 6 weeks after the general mailing, a reminder card was sent to those who had not returned a response card (Appendix E).

3.2.3 - Data Analysis

The survey data was manually entered, then analyzed using Microsoft Excel 2000 (Microsoft Corp., Redmond, WA) and SPSS 10.0 for Windows (SPSS Inc.,

Chicago, IL). Twenty percent of the returned surveys were selected using a random number generation. These surveys were hand checked by a third party to determine the rate of data entry errors.

Measures of satisfaction

As with previous studies using the DSS, responses were transformed to a numerical scale (*strongly disagree=1, disagree=2, neither=3, agree=4, strongly agree=5).* Scores for the items in each scale were averaged to determine a scale score. Categories, based on scale scores, were established to evaluate the populations' level of satisfaction: dissatisfied (1.0 to 2.5), undecided (>2.5 but <3.5) and satisfied (3.5 to 5.0).

Three individual items from the DSS were selected for further analysis. The items were: "*If my child were interested in orthodontics, I would encourage him or her*", "*Knowing what I know now, I would choose orthodontics again*" and "*Overall, I am extremely satisfied with my career.*" The percentage of respondents disagreeing (*strongly disagree* or *disagree*), undecided (*neither*) and agreeing (*agree* or *strongly agree*) with these statements were calculated.

Factors affecting job satisfaction

Pearson correlation coefficients were used to determine significant correlations between the *overall job satisfaction scale*, the *quality of life scale*, ten facet scales and the *overall occupational stress score.*

Individual analyses were completed to identify individual characteristics with significant effects on the *overall job satisfaction scale*. Independent sample t-tests, one-

way ANOVA with Tukey post hoc comparisons or two-tailed Pearson correlation coefficients were used where appropriate.

A stepwise multiple regression analysis was completed using the *overall job satisfaction scale* as the dependant variable. All of the personal and practice characteristics and the *overall occupational stress score* were included into the regression equation. Categorical variables were either transformed to a linear scale (*number of children, population of community, gross income*) or included using indicator variables (*marital status, province, practice type*).

3.3 - Results

A total response rate of 51.2% was obtained (335/654). Sixteen of the respondents were not currently practicing orthodontics. Therefore, the total number of usable responses was 319. Key descriptive data of the survey respondents is presented in Table 3.1, while comprehensive data is presented in Appendix F.

The data entry error rate was 0.089%. (13 errors in 14,656 data points) This was considered low enough to forgo confirming the entry of the remaining data.

Measures of satisfaction

The mean value for the overall job satisfaction scale was 4.02 (SD=0.63). Figures 3.1 and 3.2 presents the categorization of the *overall job satisfaction* and *quality of life scales*. A high degree of satisfaction was seen using these variables. Categorization of the facet scales is presented in Figure 3.3.

The responses to the three key indicators of job satisfaction also showed a high degree of satisfaction with the profession. (Table 3.2)

Factors affecting job satisfaction

Significant correlations were found between the *overall job satisfaction scale*, the *quality of life scale*, the facets of satisfaction scales and *overall occupational stress score*. (Table 3.3) Individual analysis showed eight characteristics to be significantly related to the *overall job satisfaction scale*. (Table 3.4)

Stepwise multiple regression analysis developed a model involving 5 characteristics that accounted for 31.6% of the variation in the *overall job satisfaction scale*. (Table 3.5) Multiple regression analyses were also completed using each of the specific facets of job satisfaction as the dependant variable. These results are presented in Appendix J.

3.4 - Discussion

This survey obtained a response rate of 51.2%. The descriptive data of the respondents indicates that a broad spectrum of orthodontists responded to the survey. Therefore, it is reasonable to assume that the results from this sample are representative of orthodontists practicing in Canada.

The modified DSS was used to measure JS in orthodontics. Validity testing was not done due to the extensive previous validity studies and use of the DSS.(4-8).

The categorization of the *overall job satisfaction scale* shows just under 80% of orthodontists can be considered satisfied with their profession. This compares very

favourably to the level of JS reported in dentistry. Using the same survey tool and analysis method, Logan et al.(7) reported three out of five dentists to be satisfied and Shugars et al.(5) reported only one out of every two dentists to be satisfied. The proportion of dentists classified as dissatisfied by Shugars et al. was approximately 12%, much higher than what was found in orthodontics.

The items considered key indicators of JS also indicate a high level of JS with the orthodontic profession. When asked directly, over 85% of orthodontists agree or strongly agree with the statement "*Overall I am extremely satisfied with my career.*" Only 4.2% of respondents disagreed with this statement, while no one strongly disagreed. Approximately 87% of orthodontists would choose the same career again. Only 49-65% of dentists have been reported to be willing to do the same.(9-13) Eighty-four percent of orthodontists would encourage an interested child to pursue orthodontics. Reports indicate 52-66% of dentists would encourage their children to enter dentistry.(10,11)

A review of the literature indicates that JS in orthodontics also compares favourably to other health professions. A 1990 study of Ontario physicians reported a mean score of 3.50 (SD=0.50) out of 5 on a 16-item overall satisfaction scale.(18) A recent report of HMO physicians found mean overall job satisfaction scale scores of 3.4 to 3.7 out of 5, depending on specialty.(19) Another recent study found 56.5% of physicians to describe themselves as satisfied or very satisfied with their profession.(20) A survey of 4501 female physicians reported that 69% would probably or definitely again become a physician.(21) Another survey found fifty-one percent of radiologists would recommend a career in radiology to a college-aged adult.(22)

One explanation for the high level of JS among orthodontists is indicated by the *quality of life scale*. An overwhelming majority of orthodontists were satisfied with their quality of life as an orthodontist. The facet of job satisfaction scales provide more indicators of why JS in orthodontics is high. The facets with the highest proportion of satisfaction are *patient relations* (92.8%), *delivery of care* (85.9%), *respect* (84.0%), *professional relations* (79.6%) and *staff* (75.9%). It appears that the work involved in orthodontics, interactions with patients, staff and colleagues and the respect derived form being an orthodontist are all positive aspects of the position. Other factors responsible for the high level of JS in orthodontists may not have been evaluated by the DSS. Dawis suggested that the needs required for job satisfaction can be organized around six factors: safety, autonomy, comfort, altruism, achievement and status.(23)

The lowest degree of satisfaction among orthodontists is found with *practice management* (41.7%) and *personal time* (49.2%). The highest degree of dissatisfaction is also found in these two facets, 15% and 26% respectively.

Patient relations has also been reported as the facet with the highest proportion of satisfaction in dentistry; between 90% and 95%.(5,7) The other facets with high satisfaction among orthodontists also had the high degrees of satisfaction in dentistry. More differences are seen between orthodontics and dentistry in areas of dissatisfaction. Although a large proportion both professions are dissatisfied with the amount of *personal time*, the facet with the highest degree of dissatisfaction in dentistry was reported as *professional environment* (approximately 42%); a facet mainly dealing with the threat of litigation.(5) The high degree of dissatisfaction with the threat of litigation may be a result of differences in the professions, or of litigious differences in the countries of the

two samples. A much higher proportion of dentists were also dissatisfied with the income they receive from practice (approximately 22%).

Correlation analyses found all of the facets of JS to be significantly ($p<0.01$) related to *overall job satisfaction* and the *quality of life scale*. The facets with the strongest correlation to *overall job satisfaction* were *respect*, *patient relations*, *income* and *delivery of care*. Most of these facets were also strongly correlated with the *quality of life* scale and had a high degree of satisfaction among the orthodontists surveyed. As could be expected, satisfaction with *personal time* was more strongly associated with *quality of life* than with *overall job satisfaction*.

Respect is reported as the facet with the highest correlation to overall job satisfaction in the dental population as well.(5,7,8) Again, the similarities between the two professions seem greater than the differences.

Overall occupational stress was found to correlate with *overall job satisfaction* ($r=-0.392$). The strength of this relationship is quite similar to that reported in previous dental studies ($r=-0.28$(7) to $r=-0.42$(8)).

The effect of JS on overall life's satisfaction is also evident in these results. The correlation between the overall job satisfaction scale and the quality of life scale was $r=0.583$. This helps to emphasize the importance of researching job satisfaction and taking efforts to maximize satisfaction at the workplace.

Identifying characteristics with significant effects on job satisfaction was completed with the hope of identifying areas where practitioners can try to improve their level of job satisfaction. An important issue to be kept in mind is that these analyses can detect significant association, but do not necessarily imply causation. For instance,

members of the CAO were found to have significantly higher *overall job satisfaction* scores. This may be because satisfied orthodontists are more likely to join the organization, rather than because joining the CAO will increase an orthodontist's satisfaction.

The same dilemma is evident when interpreting the other characteristics with significant effects on overall job satisfaction through individual analysis. While it is possible that hiring a patient coordinator, increasing staff size and taking more frequent vacations may increase an orthodontists' satisfaction, these characteristics are likely more common in a successful, satisfying practice. Similarly, an orthodontist who enjoys the profession is more likely to obtain diplomate status with the ABO.

Studies of dentists and physicians have reported that increasing age is associated with increasing JS scores.(5,8,19,21) This was not found in the orthodontic sample.

Another factor most of these studies report directly related to reports of JS is income. Among orthodontists, income was only found to affect overall job satisfaction when gross annual income was less than $50,000 a year. For all other categories of income, no significant effect was evident. The number of respondents in this category was small, and some indicated that they had just recently established their practices. In these cases, other factors are likely affecting JS as well.

Multiple regression analysis was completed to evaluate the maximum combined effect of the characteristics in the survey. The final model included 5 characteristics and explained 31.6% of the variation in *overall job satisfaction*. Membership in the CAO, total number of staff and practice location again showed significant relationships to *overall job satisfaction scores*. A possible effect of other residency training was seen.

This factor may affect reports of job satisfaction by changing the respondents' frame of reference. Individuals with more experience in other areas of dentistry may be more likely to be satisfied with orthodontics.

Through multiple regression analysis, the strongest predictor of *overall job satisfaction scores* seems to be *overall occupational stress scores*. The relationship between these two variables will be evaluated further in the following chapter.

3.5 – Conclusions

- Overall job satisfaction in orthodontists is high (79.3%), but some practitioners (2.5%) are dissatisfied with the profession.
- The most satisfying aspects of orthodontics are delivery of care, relationships with patients, staff and colleagues and the respect received as a member of the profession.
- The least satisfying aspects of orthodontics are practice management and the amount of personal time.
- Multiple regression analysis identified a model including overall occupational stress, province of practice, membership in the CAO, total number of staff and other residency training to account for 31.6% of the variation in overall job satisfaction scores.

3.6 – Chapter 3 Tables and Figures

Table 3.1 Key descriptive data of survey respondents.

Characteristic	*n*	
Age	313	Mean - 47.7 years SD - 10.4 years
Gender		
Male	269	84.3 %
Female	49	15.4 %
	318	
Years practicing orthodontics	318	Mean - 16.6 years SD - 10.4 years
Province of primary practice		
British Columbia	59	19.3 %
Alberta	32	10.5 %
Saskatchewan	9	2.9 %
Manitoba	12	3.9 %
Ontario	125	40.8 %
Quebec	52	17.0 %
New Brunswick	8	2.6 %
Prince Edward Island	1	.3 %
Nova Scotia	6	2.0 %
Newfoundland	2	.7 %
	306	
Primary type of practice		
Solo Practice	206	65.0 %
Associateship – associate	22	6.9 %
Associateship – practice owner	22	6.9 %
Partnership	41	12.9 %
Group Practice	18	5.7 %
Academic	8	2.5 %
	317	
Part-time academics		
No	231	74.3 %
Yes	80	25.7 %
	311	

Total *n* varies due to non-responses. Maximum total *n* = 319.

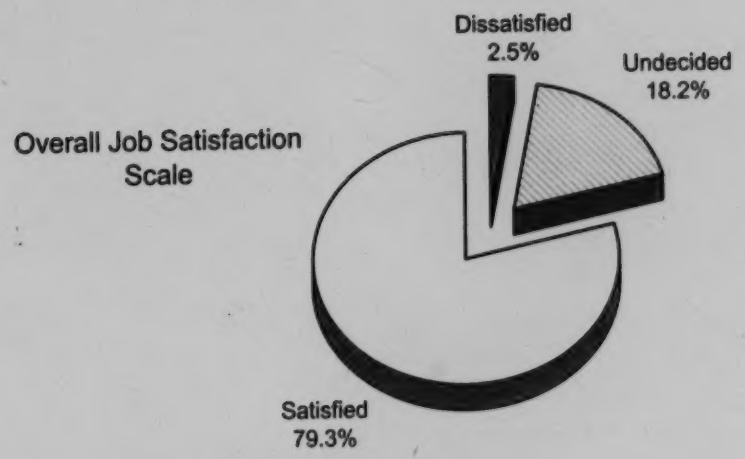

Figure 3.1 Distribution of *overall job satisfaction* scores.
Dissatisfied (1.0 to 2.5), Undecided (>2.5 but <3.5), Satisfied (3.5 to 5.0)
$n = 319$

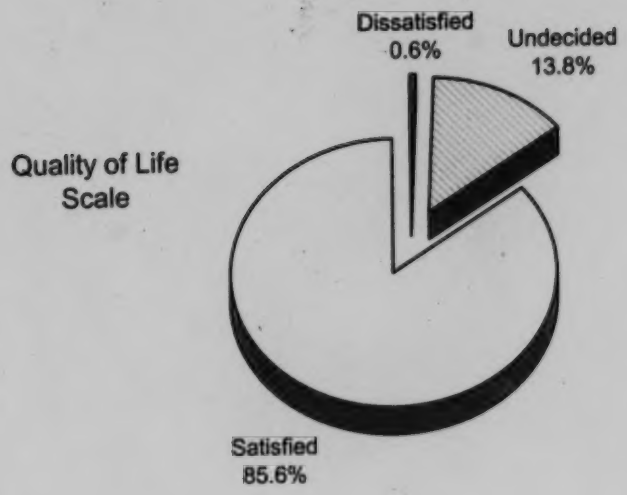

Figure 3.2 Distribution of *quality of life* scores.
Dissatisfied (1.0 to 2.5), Undecided (>2.5 but <3.5), Satisfied (3.5 to 5.0)
$n = 319$

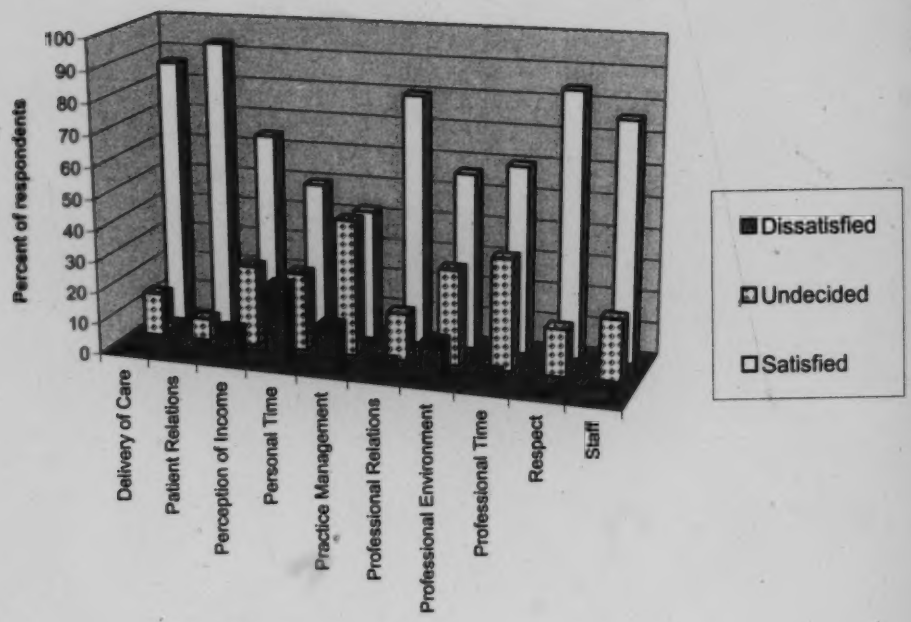

Figure 3.3 Distribution of job satisfaction facet scores.
Dissatisfied (1.0 to 2.5), Undecided (>2.5 but <3.5), Satisfied (3.5 to 5.0)
$n = 319$

Table 3.2 Distribution of responses to three key indicators of job satisfaction.

Statement	*n*	*Strongly Disagree or Disagree*	*Neither Agree nor Disagree*	*Agree or Strongly Agree*
If my child were interested in orthodontics, I would encourage him or her.	310	6.5 %	9.3 %	84.2 %
Knowing what I know now, I would choose orthodontics again.	314	7.3 %	5.4 %	87.3 %
Overall, I am extremely satisfied with my career	313	4.2 %	10.5 %	85.3 %

Table 3.3 Pearson correlation coefficients between *overall job satisfaction, quality of life* and the facets of job satisfaction.

Facet	*Overall job satisfaction scale* *r*	*Quality of life scale* *r*
Delivery of care	0.481	0.516
Patient relations	0.563	0.563
Perception of income	0.486	0.337
Personal time	0.294	0.422
Practice management	0.390	0.403
Professional environment	0.250	0.162
Professional relations	0.155	0.280
Professional time	0.351	0.456
Respect	0.670	0.554
Staff	0.446	0.403
Overall occupational stress score	-0.392	-0.344
Overall quality of life	0.583	

* All correlations significant to $p<0.01$
n=318 or 319

Table 3.4. Individual characteristics significantly related to *overall job satisfaction.*

Characteristic	*Nature of relation*	*Test*	*p-value*
Province	[a]	ANOVA with Tukeys post hoc	0.039-0.049
Type of practice	[b]	ANOVA with Tukeys post hoc	0.034
Patient coordinator	+	T-test (mean difference=0.259)	0.001
Total number of staff	+	Pearson correlation (r=0.160)	0.005
Weeks of vacation a year	+	Pearson correlation (r=0.157)	0.005
Gross income	[c]	ANOVA with Tukeys post hoc	0.002-0.029
Membership in CAO	+	T-test (mean difference=0.469)	0.001
Diplomate of ABO	+	T-test (mean difference=0.351)	0.033

[a] Saskatchewan < Manitoba, Saskatchewan < Ontario.
[b] Academic < Group Practice.
[c] less than $50,000 a year < all other categories.
n=285 to 316, depending on variable

Table 3.5 Stepwise multiple regression for *overall job satisfaction.*

Characteristic added to model	*Nature*	*p-value*
Overall occupational stress score	-	.000
Province – Saskatchewan	-	.000
Membership in the CAO	+	.003
Total number of staff	+	.004
Other residency training prior to orthodontics	+	.035

Overall $R^2 = 0.316$

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Chapter Four

The Relationship Between Occupational Stress and Job Satisfaction in Orthodontics

4.1 - Introduction

Occupational stress (OS) is the study of those aspects of work that either have, or threaten to have bad effects.(1) Job satisfaction (JS) has been defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences."(2) Low JS is considered as one of the outcomes of high OS.(1)

Many studies have evaluated the relationship between OS and JS in dentistry.(3-10) Most of these studies describe the correlation between a JS variable and an OS variable. Correlations ranging from $r=-0.24$ to $r=-0.42$ have been reported.(4;10) Shugars et al. reported OS scores to be significantly ($p<0.05$) different between a group of dentists with high-JS and low-JS.(3) The cohorts were established using the upper and lower 20% of responses to the overall job satisfaction scale of the Dentist Satisfaction Survey (DSS).(11) The high satisfaction group had a mean occupational stress score of 58 out of 100 (SD=22, n=80) on the occupational stress scale. The low satisfaction group had a mean occupational stress score of 83 out of 100 (SD=16, n=83).

No published reports have adequately evaluated OS or JS in orthodontics. The first two research papers in this thesis have identified a relationship between these two variables.

The objectives of this study were:

1. To evaluate the affect of overall occupational stress on overall job satisfaction and the facets of job satisfaction in orthodontics;
2. To evaluate the affect of categories of occupational stress on overall job satisfaction and the facets of job satisfaction in orthodontics;

3. To evaluate differences in job satisfaction between a group reporting high occupational stress and low occupational stress in orthodontics.

4.2 - Methods

4.2.1 - Survey Instrument

OS in orthodontic practice was evaluated using a list of 67 potential stressors. The items included were drawn from two sources. Approximately half of the items had been reported as stressful by general dentists.(12-15) A focus group meeting was held with three practicing orthodontists to generate a list of potential stressors unique to orthodontics. The individuals chosen for the focus group represented a variety of practice types and clinical experience. One male and two female orthodontists participated. Based on the classification system recommended by Cooper et al.(16), the items were categorized into six groupings: *income-, patient-, referral-, staff-, time- and work-related stressors*. Respondents were asked how stressful they found item using a 5-point scale. The end points of the scale were "not stressful" (1) and "very stressful" (5).

An additional item provided an overall measure of OS in orthodontics. Responses to the question "Overall, how stressful do you find the practice of orthodontics?" was considered the *overall occupational stress score*. A scale form 0 (not stressful) to 100 (very stressful) was used.

A modified version of the DSS was used to evaluate JS.(3) Where necessary, items were re-worded to allow their use among orthodontists. In total, 52 items were used. Ten items comprised the *overall job satisfaction scale*. The remaining 42 items were used to measure ten facets of JS. The facets included were: *delivery of care*,

perception of income, patient relations, personal time, practice management, professional environment, professional relations, professional time, respect and *staff*. An additional six items formed a *quality of life scale*. The respondent was asked to uses a 5-point scale to indicate their level of agreement with the statement. The scale included: *strongly disagree=SD, disagree=D, neither agree nor disagree=N, agree=A, strongly agree=SA*.

A test group, comprised of three practicing orthodontists was formed. The test group evaluated the initial version of the survey and made suggestions for improvements. The final version of the survey is presented in Appendix B.

4.2.2 - Survey Distribution

The addresses of all orthodontists practicing in Canada in January of 2001 were compiled. This was obtained from the listings of each provincial regulatory body. Excluding clinicians involved in the construction of the survey, 658 orthodontists were identified.

Each orthodontists was sent a mail-out. The mail-outs included the survey, an introduction letter (Appendix C), a postage-paid return envelope and a stamped response card (Appendix D). The survey was to be anonymously returned in the provided envelope while the response card was to be returned separately. The response cards were used to monitor which orthodontists had returned the survey. Approximately 6 weeks following the general mailing, a reminder card was sent to everyone who had not returned a response card (Appendix E). The response card also provided the respondents with a way to request a copy of the results of the project.

Eleven of the mail-outs were returned due to an incorrect address and redistributed when a correct address was found. Four of the mail-outs were returned and could not be re-distributed because a correct address could not be found. Therefore, 654 orthodontists received a copy of the survey.

4.2.3 - Data Analysis

The survey responses were coded and manually entered into Microsoft Excel 2000 (Microsoft Corp., Redmond, WA). The data entry error rate was determined by a third party who checked 20% of the returned surveys. A random number generation was used to select the surveys to be checked. Data analysis was completed using SPSS 10.0 for Windows (SPSS Inc., Chicago, IL).

Overall OS was represented by the *overall occupational stress* score. *Category scores* were calculated using the mean score for the items in each category of stressors.

As with previous studies using the DSS, responses were transformed to a numerical scale (*strongly disagree=1, disagree=2, neither=3, agree=4, strongly agree=5).* Scores for the items in each scale were averaged to determine a scale score.

Pearson correlation coefficients were used to determine significant relationships between *overall occupational stress*, OS *category scores*, *overall job satisfaction* and JS facet *scale scores*.

High- and low-stress cohorts were established using *overall occupational stress scores*. Those with responses greater than one standard deviation above the mean were considered high-stress, while individuals with responses more than one standard deviation below the mean were labeled as low-stress. Independent sample t-tests were

used to determine significant differences between the high- and low-stress groups in *overall job satisfaction* and the JS facet *scale scores*.

4.3 - Results

The final response rate was 51.2% (335/654). A total of 319 of the respondents were included in the analysis. The remain 16 respondents were retired or not currently practicing orthodontics. A data entry error rate of 0.089% was found in the selected surveys. The remaining surveys were not checked because of the low data entry error rate.

Tables 4.1 – 4.3 present the results of correlation analyses between *overall occupational stress*, OS *category scores*, *overall job satisfaction* and JS facet *scale scores*.

Seventy-nine respondents were included in the high-stress grouping. Fifty-nine respondents were classified as low-stress. Table 4.4 summarizes the results of independent sample t-tests to evaluate differences in JS between the high- and low-stress cohorts.

4.4 - Discussion

Correlation analyses showed *overall occupational stress* to be significantly related to *overall job satisfaction*, *quality of life* and all of the JS facet *scale scores*. Most of the facets with strong correlations to overall occupational stress scores seemed to involve time-management and organization issues: *personal time*, *practice management*, *professional time and staff*. As expected, factors not directly related with the daily

operations of a practice were not as strongly related with overall occupational stress scores: *professional relations* and *professional environment* (mainly threat of litigation).

These results are similar to those reported for a group of Kentucky dentists responding to the DSS.(10) Facets related to time-management and organization were also strongly associated with OS scores in dentistry. The correlation between satisfaction with *staff* and OS scores was lower in dentistry (r=-0.12) than in orthodontics (r=-0.27). This may indicate a greater reliance on auxiliaries in an orthodontic practice than in a dental practice. *Perception of income* had a stronger association with OS scores in the dental study (r=-0.25 vs. r=-0.16). The dental study also reported a stronger correlation between OS and the *professional environment* (r=-0.22 vs. r=0.15), a facet mainly measuring the threat of litigation. A study using a sample of Californian dentists reported this facet had the strongest correlation to OS scores (r=-0.28). This may indicate a difference in the perceived threat of litigation between the professions, or between the countries of the samples.

All of the OS categories had significant ($p<0.05$) correlations with *overall job satisfaction*. While reported overall OS seems to be most strongly related to satisfaction with time-management factors, stressors related to time-management factors appear to have a weaker influence on overall JS. While these findings may appear contradictory, they are not. Time-related issues have a larger influence on overall OS than overall JS. The types of stressors that have the greatest influence on overall JS are those associated with the work of orthodontics and the financial aspects of practice: *work-related* and *income-related.*

Correlation analyses between the OS categories and the facets of JS show that *work-related* stressors have significant effects on all of the JS facet scales. *Income-related* stressors have influence on most of the JS facet scales. As expected, the strongest correlation of *income-related* stressors is with *perception of income* and *practice management*. As financial stressors increase, satisfaction with income decreases.

Another expected strong correlations was seen between *time-related* stressors and *personal* and *professional time*. As *time-related* stressors increase, satisfaction with *professional time* and the amount of *personal time* decreases. As *staff-related* stressors increase, satisfaction with *staff*, *practice management* and *professional time* decreases.

No significant relationship was seen between *time-related* stressors and the *perception of income*. As *time-related stressors* increase, practitioners would likely expect to be better compensated for their efforts, but as *time-related* stressors increase, income is likely increasing as well.

No significant correlation was found between *referral-related* stressors and satisfaction with *professional relations*. As *referral-related* stressors increased, one would expect satisfaction with *professional relations* to decrease. This, surprisingly, was not supported by the results.

This analysis further shows the importance of the relationship between OS and time-management and organization factors. Satisfaction with *professional time* and *practice management* was strongly and significantly related to all of the categories of OS. Orthodontists wishing to decrease occupational stress should find improvements in time-management to decrease many types of occupational stressors.

The final analyses of this chapter compared *overall job satisfaction*, *quality of life* and JS facet *scales scores* between groups of high- and low-stress orthodontists. The affect of high OS is clearly demonstrated. *Overall job satisfaction*, *quality of life* and JS facet *scale scores* were all significantly lower in the high-stress orthodontists. Once again, these results point to the relationship between occupational stress and time-management and organization. The facets with the highest mean differences and t-values were *personal time* and *practice management*. The facets with the least significant difference were again those not related with the daily operations of the practice: *professional relations* and *professional environment*.

4.5 – Conclusions

- A negative correlation exists between reports of OS and JS in orthodontics.
- Overall OS affects all of the facets of JS in orthodontics, the strongest affects being on satisfaction with personal time, practice management and respect received as a member of the profession. All categories of OS affect overall JS in orthodontics, the strongest affects being from work-, income- and patient-related stressors.
- The strongest correlations exist between:
    - Income-related stressors and satisfaction with income,
    - Income-related stressors and satisfaction with practice management,
    - Time-related stressors and satisfaction with professional time,
    - Time–related stressors and satisfaction with personal time, and
    - Work-related stressors and satisfaction with professional time.

- Orthodontists reporting high occupational stress report lower job satisfaction, especially regarding amount of personal time and practice management.

4.6 – Chapter 4 Tables

Table 4.1 Pearson correlation coefficients between *overall occupational stress* and job satisfaction scales.

	Overall occupational stress score	
	r	*p-value*
Overall job satisfaction	-0.392	0.000
Quality of life	-0.344	0.000
Delivery of care	-0.209	0.000
Patient relations	-0.271	0.000
Perception of income	-0.157	0.006
Personal time	-0.385	0.000
Practice management	-0.334	0.000
Professional environment	-0.151	0.008
Professional relations	-0.121	0.034
Professional time	-0.299	0.000
Respect	-0.310	0.000
Staff	-0.270	0.000

n=306

Table 4.2 Pearson correlation coefficients between *overall job satisfaction* and categories of occupational stressors.

	Overall job satisfaction scale	
Stressor category	*r*	*p-value*
Work-related	-0.301	0.000
Income –related	-0.268	0.000
Patient-related	-0.259	0.000
Referral-related	-0.204	0.000
Time-related	-0.177	0.001
Staff-related	-0.173	0.002

n=319

Table 4.3 Pearson correlation coefficients between facets of job satisfaction and categories of occupational stressors.

Facet of job satisfaction	*Category of occupational stressors*					
	Time-related	*Staff-related*	*Patient-related*	*Work-related*	*Income-related*	*Referral-related*
Delivery of care	-0.147**	-0.128*	-0.197**	-0.216**	-0.114*	-0.182**
Patient relations	-0.134*	-0.171**	-0.315**	-0.258**	-0.192**	-0.266**
Perception of income	-0.042	-0.126*	-0.249**	-0.208**	-0.427**	-0.176**
Personal time	-0.339**	-0.233**	-0.119*	-0.189**	-0.182**	-0.071
Practice management	-0.230**	-0.258**	-0.314**	-0.312**	-0.394**	-0.233**
Professional environment	-0.075	-0.023	-0.195**	-0.169**	-0.123*	-0.179**
Professional relations	-0.067	-0.056	-0.074	-0.112*	-0.099	-0.092
Professional time	-0.356**	-0.273**	-0.285**	-0.330**	-0.291**	-0.233**
Respect	-0.115*	-0.184**	-0.272**	-0.232**	-0.236**	-0.254**
Staff	-0.167**	-0.260**	-0.246**	-0.233*	-0.318**	-0.204**

* $p<0.05$
** $p<0.01$
n=318 or 319, depending on facet of job satisfaction

Table 4.4 Differences in satisfaction scale scores between high- and low-stress groups.

	High stress n=79 Mean (SD)	*Low stress n=59 Mean (SD)*	*Independent sample t-test*		
			Mean Difference	*t*	*p-value*
Overall job satisfaction	3.59 (0.68)	4.27 (0.52)	0.69	6.44	.000
Quality of life	3.81 (0.52)	4.31 (0.36)	0.51	6.71	.000
Delivery of care	3.84 (0.51)	4.10 (0.42)	0.25	3.09	.002
Patient relations	3.96 (0.47)	4.34 (0.40)	0.37	4.86	.000
Perception of income	3.50 (0.87)	3.87 (0.73)	0.37	2.65	.009
Personal time	2.77 (1.01)	3.77 (0.89)	1.00	6.17	.000
Practice management	3.16 (0.67)	3.87 (0.66)	0.70	6.09	.000
Professional environment	3.50 (0.95)	3.92 (0.86)	0.42	2.64	.009
Professional relations	3.83 (0.67)	4.07 (0.71)	0.24	2.00	.047
Professional time	3.34 (0.60)	3.83 (0.53)	0.50	5.07	.000
Respect	3.82 (0.62)	4.32 (0.49)	0.50	5.12	.000
Staff	3.65 (0.66)	4.11 (0.69)	0.46	3.97	.000

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Chapter Five

General Discussion

5.1– Discussion and Answers to Research Questions

The goal of this research project was to thoroughly evaluate potential stressors, overall occupational stress and job satisfaction in practicing orthodontists. This was completed using an anonymous, self-administered, mail-out survey distributed to almost all orthodontists practicing in Canada. As this was the first survey to evaluate occupational stress and job satisfaction in orthodontics, previous research in the dental field was used for guidance during the project. The project was completed with the hope of finding information that may be helpful to an orthodontist who hopes to reduce occupational stress and increase job satisfaction.

Research Question #1 – What are the most stressful aspects of orthodontic practice?

The first step in controlling occupational stress is to identify and describe sources of stress. This study identified many sources of stress; some of these are common to dentistry, while others are unique to orthodontics. The items identified as the most stressful, based on mean severity scores were:

1 - The patient shows dissatisfaction with the care received.

2 - Performing clinical tasks on a difficult or uncooperative patient

3 - Falling behind schedule

The most important fact learned from this analysis was the amount of variation in the responses. Each item was scores as "very stressful" by at least one orthodontist. Reports

of occupational stress are obviously greatly influenced by personality and an individuals' interpretation of the situation.

This list of items is useful when discussing the profession of orthodontics as a whole. It may also serve as a guide for an individual practitioner to try to identify the aspects of orthodontics he or she finds most stressful.

Another finding of the study was that time-related stressors had the highest average severity of stress scores. This is the first suggestion that improving time-management skills should decrease occupational stress. Staff-related stressors also received high average stress scores. This suggests that maintaining good relations with staff will also decrease occupational stress.

Research Question #2 – What are the most frequently occurring potential stressors in orthodontic practice?

The most frequently occurring stressors based on mean frequency scores were:

1 - Managing adult patients

2 - Patients being late for or missing adjustment appointments

3 - Motivating patients with poor elastic and/or headgear compliance

Determining the frequency of the stressor may be more important than determining the severity of the stressor. The body may be able to adapt to short term, high severity stressors better than persistent, low severity stressors. This does, however, depend on the severity and the duration of the stressors.

Research Question #3 – What are the most concerning potential stressors in orthodontic practice: those that are stressful and occur frequently?

The results indicated that most severe stressors usually occurred infrequently, and the most frequent stressors usually were not very severe. The most concerning stressors are those with high severity and frequency. These items were defined having mean severity and mean frequency scores of 3.00 or greater. These were:

1 - Falling behind schedule

2 - Trying to keep to a schedule

3 - Constant time pressures

4 - Patients with broken appliances

5 - Motivating patients with poor OH and/or decalicification

Four of these items are concerned with time-management issues. This again provides evidence that improved time-management skills will reduce occupational stress.

The other item involves motivating patients with poor oral hygiene. Increasing patient co-operation with brushing may decrease the stress on the practitioner. Frequent hygiene instruction, use of electric brushes, and rewards systems are a few methods that may improve cooperation and reduce clinicians' stress. Use of materials such as fluoride releasing bonding agents may also help decrease the stress in these situations.

Research Question #4 – Are there statistically significant relationships between overall occupational stress and various personal and practice characteristics of orthodontists?

The survey collected a long list of demographic data from the respondents. Individual analyses identified seven items that were significantly related to increased

overall occupational stress scores. These were: age, years of practice, part-time academics, hours worked a week, weeks of vacation a year, participation in a study club, and job satisfaction. The following characteristics were identified as being related to overall occupational stress scores through multiple regression analysis: job satisfaction, age, participation in a study-club, hours worked a week, part-time academics, days of continuing education a year and participation in stress management.

Regression analyses were completed using two other dependant variables: mean severity scores and severity score mode. (Appendix H) These analyses identified fewer significant characteristics, but both found a significant relationship with job satisfaction, age and gender. Females were found to report more occupational stress.

When considering these results, it is important to remember that significant relationships do not imply causation. Another factor limiting the usefulness of these results is that few of the factors are easy to change. As well, the high degree of individual variation limits the usefulness of the results to any one orthodontist. Again, these results may serve as a guide for a practitioner to discover what situation may decrease their own level of stress. Participation in part-time academics may increase occupational stress in one practitioner, but it may decrease occupational stress in another practitioner. The strong influence of other factors, such as personality, on evaluations of occupational stress is indicated by the relatively low R^2 value in the regression analysis. Even with all of the characteristics investigated, only 35% of the variation in reported occupational stress could be explained.

The results do seem to indicate that taking time away from the office may decrease occupational stress. Fewer hours a week, more frequent vacations and more

days of continuing education may decrease stress, but this must be done with the proper planning. Decreasing office hours while maintaining the same patient base will likely increase stress because of greater time-related stressors. Again, the results seem to indicate improved time-management skills may decrease occupational stress by decreasing the amount of time spent in the office.

In an attempt to help practitioners with specific types of stressors, regression analyses were completed for each of the categories of potential stressors (Appendix I). These analyses identify job satisfaction and female gender as being significantly related to all of the categories of stressors. This helps to emphasize the relationship between occupational stress and job satisfaction. Unfortunately, few easily modified characteristics were discovered and the regression models suffer from low R^2 values. (R^2=0.180 to 0.235)

At the very least, the results should provide some comfort to practitioners with the fact that in time and with experience, the stress from practice should decrease.

Research Question #5 – What proportion of orthodontists are satisfied with their profession?

A very large majority of orthodontists are satisfied with their profession. Using a 10-item scale, 79.3% of orthodontists were classified as satisfied with their career. Using items considered key indicators of satisfaction, 84.2% to 85.3% of orthodontists responded as being satisfied with the profession. The most satisfying aspects of orthodontic practice are the delivery of care, relationships with patients, staff and colleagues and the respect derived from being an orthodontist.

This information may be helpful to dentists who are considering entering orthodontics as a profession. It also is a reminder to orthodontists that the profession provides opportunities that should not be taken for granted.

Satisfaction with orthodontics is, however, not universal. A small proportion of orthodontists are not satisfied with their careers. This should not be surprising considering the effect personality and individual factors seem to have on occupational stress and job satisfaction. Dissatisfied orthodontists will hopefully benefit from finding that others are not satisfied with the profession as well.

The facets of orthodontics with the highest degree of dissatisfaction are the amount of personal time and practice management. Once again, the importance of time-management and organization is apparent, here in affecting job satisfaction. As well, the importance of business management skills is evident. An orthodontist who does not enjoy business management may benefit from finding ways to minimize their daily involvement in the business aspects of the practice.

Research Question #6 - Are there statistically significant relationships between overall job satisfaction and various facets of job satisfaction among orthodontists?

All facets of job satisfaction are significantly related to overall job satisfaction. The strongest correlations are with the respect derived from the profession, patient relations, perception of income, delivery of care, staff and practice management. Theoretically, efforts aimed at increasing satisfaction with these facets should have the greatest affect on overall job satisfaction.

Of these facets, one that can be modified is satisfaction with staff. This provides more evidence of the importance of staff issues in an orthodontic office. Careful selection of staff, efficient use of staff's skills and efforts to keep staff satisfied with their positions will likely improve the overall job satisfaction of the orthodontist.

Another of these facets that may be modified is practice management. Perhaps improving business skills, through courses or continuing education, would increase satisfaction with practice management and in turn overall job satisfaction.

Research Question #7 – Are there statistically significant relationships between job satisfaction and various personal and practice characteristics among orthodontists?

As with overall occupational stress, individual and multivariate analyses were completed to identify characteristics associated with job satisfaction. Most of the same concerns should be kept in mind when analyzing these results: significant relationships do not imply causation, characteristics may be difficult to modify, individual variation is great and the strength of the regression model is relatively weak. Individual analyses found significant relationships between overall job satisfaction and province of practice, type of practice, patient coordinator, total number of staff, weeks of vacation a year, gross income, membership in the CAO and diplomate status with the ABO. Multivariate regression analysis found a model including occupational stress, province of practice, Membership in the CAO, total number of staff and other residency training prior to entering orthodontics to account for 31.6% of the variation in overall job satisfaction scores.

The first characteristic added to the regression model was occupational stress, reinforcing the importance of occupational stress in determining job satisfaction.

Another interesting finding is the weak relationship between job satisfaction and practice type. The only significant difference was an increased job satisfaction in those practitioners in a group practice over those in an academic position. No statistically significant difference was seen in the job satisfaction of orthodontists practicing alone, in partnerships, or in a group practice. Although each practice type may have it's own benefits and drawbacks, overall job satisfaction is similar between most types of practice.

Another interesting finding is the lack of a significant relationship between gross income and job satisfaction, once income was above $50,000 a year. However, perception of income was significantly related to overall job satisfaction. Taking steps to increase income will likely not affect job satisfaction without other changes occurring at the same time. Again, the practitioners' interpretation of the situation seems most important. The regression analysis for perception of income (Appendix J) does provide some indication of how perception of income can be modified. The regression model included 10 characteristics and had an R^2 of 0.427. Obviously, increased gross income seemed to be the most important characteristic. Population of the community was inversely related to perception of income. Other characteristics included were having a patient coordinator and the total number of staff. While it may be true that larger practices, generating more income, likely use more auxiliaries, it may also be true that more auxiliaries improves time-management and efficiency, generating increased income.

Unfortunately, regression analyses for the other facets of job satisfaction (Appendix J) did not reveal much useful information. This information would have been most useful for the facets highly related to overall job satisfaction: respect, patient relations, delivery of care and staff. The regression models for each of these facets had low R^2 values (R^2=0.158 to 0.238) and few easily modified characteristics were included.

Research Question #8 - Is there a statistically significant relationship between overall occupational stress and overall job satisfaction among orthodontists?

The relationship between occupational stress and job satisfaction is well supported by the results of this survey. The following important conclusions can be made:

- Variables representing the occupational stress and job satisfaction were significantly correlated (r=-0.392).
- Job satisfaction was the most important characteristic in the regression model predicting occupational stress.
- Occupational stress was the most important characteristic in the regression model predicting job satisfaction.
- All categories of occupational stress affected overall job satisfaction.
- Overall occupational stress can affect all facets of job satisfaction.
- A group of high-stress orthodontists reported significantly lower job satisfaction scores than a group of low-stress practitioners.

This relationship is important to orthodontists wanting to maximize job satisfaction. The results show some characteristics are associated with occupational stress, but the greatest influence in undoubtedly from personality and individual differences. Possibly, these traits could be changed and provide a way to greatly improve job satisfaction. Theoretically, learning how to better manage stress should increase satisfaction with the profession. Surprisingly, involvement in stress-management was actually associated with increased reports of occupational stress in the multivariate regression analysis. The effectiveness of stress-management is an issue that may deserve further study.

5.2 - Major Conclusions

From the results of this study, the following major conclusions can be made:

- A large amount of individual variation is found in evaluations of overall occupational stress and potential stressors in orthodontics.
- The most concerning stressors in orthodontic practice seem to involve time-management and patient cooperation issues.
- A relationship exists between occupational stress and job satisfaction in orthodontics.
- Job satisfaction in orthodontics is high, but not universal.
- The most satisfying aspects of orthodontics are delivery of care, relationships with patients, staff and colleagues and the respect derived as a member of the profession.
- The least satisfying aspects of orthodontic practices are practice management and the amount of personal time.

- Both occupational stress and job satisfaction are more affected by other factors, such as personality, than the characteristics evaluated by this survey.

5.2– Limitations

Several points must be considered when reviewing the results of this survey.

The results can be assumed to represent the population from which the respondents were taken, specifically, orthodontists currently practicing in Canada. Differences in orthodontists practicing in other countries may affect the results. For example, the facet of job satisfaction assessing professional environment was mainly concerned with the threat of litigation. This threat was of concern to dental practitioners in the United States.(1,2) Orthodontists in the United States may be more concerned with the threat of litigation than their Canadian counterparts.

Attitude surveys are completed with the assumption that attitudes are measurable traits that can be assessed through direct responses from a population. There is a possibility the sample responded, either knowingly or unknowingly, in a manner not reflective of their true attitudes. The results obtained through this study did not deviate greatly from previous reports of occupational stress or job satisfaction in the dental field or current attitude theory.

Another concern about attitude surveys is the claim of validity. Any survey is susceptible to it's own biases. The results of this survey may have been significantly different if other items had been chosen for inclusion. The DSS was used to evaluate job satisfaction because of extensive previous use and validity testing.(1-5) Our results were

similar to those reported in previous studies. This strengthens our assumption about the validity of the results, but is may indicate some biases within the DSS itself.

As previously indicated, interpretation of these results must consider that significant relationships do not indicate causation. The results do not explain why a relationship exists, simply that it does exist. It is through interpretation of the results that meaning is assigned to the relationships.

Another limitation that was previously discussed was due to the wide range of the results. In most cases, individual differences within a variable were greater than the differences between variables. However, the variability seen in these results are similar to the amount of variation reported in other occupational stress and job satisfaction surveys.

A few specific concerns were found with some of the items in this survey. These are mentioned to help future surveys that may be completed. Although all of the items included as potential stressors were unique, some differences were subtle enough that some respondents felt they were repetitious. An example is the items "*Patients transferring to another office in your area*" and "*Patients transferring out of your office to another area.*" Another item of concern was the question evaluating income. The question was worded "*What is you annual gross personal income from orthodontics?*" Some respondents were unsure of how this item was defining income. A clarifying statement may have improved this item. Unfortunately, some of the items included as potential stressors were also unclear to some respondents, prompting them to questing what the item meant. These items included "*High concentration levels*", "*Difficult physical working conditions*" and "*Physical demands of the practice.*" A final item, from

the DSS, that was unclear was "*The business side of my practice is in shambles.*" Some respondents from Quebec were unfamiliar with the word "shambles."

5.3– Future Studies

As this was the first study to evaluate occupational stress and job satisfaction in orthodontics, many follow-up studies could be considered.

Perhaps the area most deserving of study is the effectiveness of stress-management training. The relationship between occupational stress and job satisfaction is clear, but the effectiveness of trying to change how orthodontists deal with stress is unclear.

Time-management skills appear to have a strong affect on occupational stress and job satisfaction. Future studies could examine the effectiveness of time-management techniques and time-management training in orthodontics.

Patient co-operation issues were discovered to be concerning issues in orthodontics. A useful area to study would be the effectiveness of various patient motivation techniques.

One of the most dissatisfying aspects of orthodontic practice was found to be practice management. Future studies could examine the effectiveness of various business management techniques. As well, studying the most effective way to educate orthodontists about these techniques could be beneficial

This study indicates that personality and other individual factors are strongly related to interpretations of occupational stress and job satisfaction. If possible, it would be beneficial to include personality testing in future studies addressing issues such as

occupational stress, job satisfaction, time-management, or practice management in orthodontics.

5.4– Final Comments

Throughout the course of this project, a great deal of feedback was received from orthodontists across the country. This topic is interesting because all orthodontists can relate to these issues, and everyone has an opinion to share. Perhaps this thesis will stimulate discussion on the topics of occupational stress and job satisfaction in orthodontics. Hopefully this will help those few who feel that orthodontics is too stressful or who are dissatisfied with orthodontics. The most enthusiastic comment about the profession came from a respondent who wrote: "*The only thing I'd rather be doing than orthodontics is being the starting goalie for the Colorado Avalanche...not back-up...starting.*"

5.5– Bibliography

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Appendices

Appendix A: Ethics approval

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UNIVERSITY OF ALBERTA HEALTH SCIENCES FACULTIES,
CAPITAL HEALTH AUTHORITY, AND CARITAS HEALTH GROUP

HEALTH RESEARCH ETHICS APPROVAL

Date:	March 2001
Name of Applicant:	Dr. Stephen Roth
Organization:	University of Alberta
Department:	Graduate Studies; Dentistry
Name of Supervisor:	Dr. Paul Major
Organization:	University of Alberta
Department:	Dentistry
Project Title:	A Survey to Evaluate Occupational Stress and Job Satisfaction in Canadian Orthodontics

The Health Research Ethics Board has reviewed the protocol for this project and found it to be acceptable within the limitations of human experimentation. The HREB has also reviewed and approved the subject information material and consent form (if applicable).

The approval for the study as presented is valid for one year. It may be extended following completion of the yearly report form. Any proposed changes to the study must be submitted to the Health Research Ethics Board for approval.

Sharon Warren

Dr. Sharon Warren
Chair of the Health Research Ethics Board (B: Health Research)

File number: B-050301-DENT

University of Alberta | Capital Health | CARITAS HEALTH GROUP

Appendix B: Orthodontic Stress and Satisfaction Survey - Page 1

UNIVERSITY OF ALBERTA

ORTHODONTIC STRESS AND SATISFACTION SURVEY

SECTION I: The following questions will provide us with information about you and your practice. Each item has been shown to affect reports of occupational stress and job satisfaction. Your responses will remain anonymous. Please answer all of the questions to the best of your knowledge.

1. **Are you currently practicing orthodontics?**
   - ☐ No ⟶ If you are not, please mark the box at the left and return the response card and survey.
   - ☐ Yes

2. **What year were you born?**

   _____year of birth.

3. **What is your gender?**
   - ☐ Male
   - ☐ Female

4. **What is your marital status?**
   - ☐ Single
   - ☐ Married
   - ☐ Separated/Divorced
   - ☐ Widowed

5. **How many children do you have?**
   - ☐ None
   - ☐ One
   - ☐ Two
   - ☐ Three
   - ☐ Four or more

6. **How many years have you practiced orthodontics?**
   (Please exclude years spent in graduate orthodontic training.)

   _____years of orthodontic practice.

Appendix B: Orthodontic Stress and Satisfaction Survey- Page 2

7. **Have you completed any other residency or dental specialty training?**
(Please include specialties and GPR, AEGD etc.)
- ☐ No
- ☐ Yes

→ **7b. If so, what training?**

_____other training.

8. **Did you practice general dentistry prior to your orthodontic graduate training?**
(Please exclude those years in dental school or other residency training.)
- ☐ No
- ☐ Yes

→ **8b. If so, for how many years did you practice general dentistry?**

_____years of general dentistry practice.

9. **Prior to entering dentistry, did you work in another profession?**
- ☐ No
- ☐ Yes

→ **9b. If so, what profession?**

_____previous profession.

9c. For how many years did you work in this previous profession?

_____years working in previous profession

10. **In which province is your primary practice?**

☐	British Columbia	☐	Quebec
☐	Alberta	☐	New Brunswick
☐	Saskatchewan	☐	Prince Edward Island
☐	Manitoba	☐	Nova Scotia
☐	Ontario	☐	Newfoundland

11. **What is the population of the community in which your primary practice is located?**

☐	< 50,000	☐	200,000 - 250,000
☐	50,000 - 100,000	☐	250,000 - 300,000
☐	100,000 - 150,000	☐	300,000 - 350,000
☐	150,000 - 200,000	☐	> 350,000

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 3

12. Which of the following best describes your primary practice or position?

- ☐ Solo practice
- ☐ Associateship - associate
- ☐ Associateship - practice owner
- ☐ Partnership
- ☐ Group practice
- ☐ Academic ⟶ Please skip to question #15

13. How many of each of the following types of auxiliaries are employed at your primary practice?

Reception/Secretarial Staff _____
Patient-care Coordinators _____
Business Managers _____
Chair-side Staff _____
Laboratory Technicians _____

14. Are you affiliated with an academic institution as an instructor or researcher on a part-time basis?

- ☐ No
- ☐ Yes

14b. If so, how many days a week are you involved?

_____days a week in academic institution.

15. Do you practice at a secondary or satellite location?

- ☐ No
- ☐ Yes

15b. If so, how many locations?

_____location(s).

16. How many hours do you work in orthodontics during the average working week?

_____hours per working week.

17. How many weeks vacation do you take during the average year?

_____weeks per year.

Appendix B: Orthodontic Stress and Satisfaction Survey - Page 4

18. What is your annual gross personal income from orthodontic practice?

☐	< $50,000	☐	$250,000 - $300,000
☐	$50,000 - $100,000	☐	$300,000 - $350,000
☐	$100,000 - $150,000	☐	$350,000 - $400,000
☐	$150,000 - $200,000	☐	$400,000 - $450,000
☐	$200,000 - $250,000	☐	>$450,000

19. Are you a member of the Canadian Association of Orthodontists?

☐ No
☐ Yes

20. Are you a Fellow of the Royal College of Dental Surgeons Of Canada?

☐ No
☐ Yes

21. Are you a Diplomat of the American Board of Orthodontists?

☐ No
☐ Yes

22. How many days do you spend at continuing education functions in an average year?

_____days per year.

23. Are you a member of a study-club that meets on a regular basis?

☐ No
☐ Yes

24. Do you participate in any activity <u>specifically</u> for stress management?

☐ No
☐ Yes

→ **24b. If so, what activity do you participate in?**

_____

24c. How often do you participate in this activity?

_____hours/times per week.

SECTION II →

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 5

SECTION II: The following situations are potentially stressful in orthodontic practice. Please indicate how stressful you find the situation, and how frequently you face the situation. Use the following scales:

How stressful is the situation?

Not Stressful.....Very Stressful
1 2 3 4 5

How often do you face the situation?

Never.....Rarely.....Monthly.....Weekly.....Daily
N R M W D

		How Stressful?	How Often?
1.	Treating adult patients.	1 2 3 4 5	N R M W D
2.	Patients expressing that your fees are too high.	1 2 3 4 5	N R M W D
3.	The patient expresses dissatisfaction with the care received.	1 2 3 4 5	N R M W D
4.	Difficult physical working condition.	1 2 3 4 5	N R M W D
5.	Having to train new assistants.	1 2 3 4 5	N R M W D
6.	Trying to keep to a schedule.	1 2 3 4 5	N R M W D
7.	Feeling inadequately trained to run a business.	1 2 3 4 5	N R M W D
8.	Patients being late or missing adjustment appointments.	1 2 3 4 5	N R M W D
9.	Maintaining good communication with other specialists.	1 2 3 4 5	N R M W D
10.	Having difficulties gaining confidence of patients.	1 2 3 4 5	N R M W D

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 6

Not Stressful.....Very Stressful
1 2 3 4 5

Never.....Rarely.....Monthly.....Weekly.....Daily
N R M W D

		How Stressful?	How Often?
11.	General practitioners questioning case management.	1 2 3 4 5	N R M W D
12.	Managing patients referred to you later than appropriate.	1 2 3 4 5	N R M W D
13.	High concentration levels.	1 2 3 4 5	N R M W D
14.	Managing disagreements with partners.	1 2 3 4 5	N R M W D
15.	Inability to meet my own expectations.	1 2 3 4 5	N R M W D
16.	Motivating patients with poor elastic and/or headgear compliance.	1 2 3 4 5	N R M W D
17.	Relapse in retention patients.	1 2 3 4 5	N R M W D
18.	Dealing with complaints from staff.	1 2 3 4 5	N R M W D
19.	Getting along with patients.	1 2 3 4 5	N R M W D
20.	Managing paperwork.	1 2 3 4 5	N R M W D
21.	Staff leaving the office for other employment.	1 2 3 4 5	N R M W D
22.	Patients or parents questioning expertise.	1 2 3 4 5	N R M W D
23.	Patients transferring to another office in your area.	1 2 3 4 5	N R M W D
24.	Managing staff illnesses.	1 2 3 4 5	N R M W D
25.	Pressure from patients and/or parents to remove appliances before treatment is completed to your satisfaction.	1 2 3 4 5	N R M W D

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 7

Not Stressful.....Very Stressful
1 2 3 4 5

Never.....Rarely.....Monthly.....Weekly.....Daily
N R M W D

		How Stressful?	How Often?
26.	Isolation from other orthodontists.	1 2 3 4 5	N R M W D
27.	Motivating patients with poor OH and/or decalcification.	1 2 3 4 5	N R M W D
28.	Realizing that your treatments are not permanent.	1 2 3 4 5	N R M W D
29.	Communication problems with the staff.	1 2 3 4 5	N R M W D
30.	Falling behind schedule.	1 2 3 4 5	N R M W D
31.	Maintaining good communication with general dentists.	1 2 3 4 5	N R M W D
32.	Assuming a heavy financial burden.	1 2 3 4 5	N R M W D
33.	Managing "burnt-out" patients.	1 2 3 4 5	N R M W D
34.	Managing relations with a poor referral source.	1 2 3 4 5	N R M W D
35.	Patient's missing fee payments.	1 2 3 4 5	N R M W D
36.	Problems getting along with staff.	1 2 3 4 5	N R M W D
37.	Administrative duties.	1 2 3 4 5	N R M W D
38.	Organizing and interacting with the staff.	1 2 3 4 5	N R M W D
39.	With time, feeling less intellectual stimulation.	1 2 3 4 5	N R M W D
40.	Constant time pressures.	1 2 3 4 5	N R M W D

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 8

Not Stressful.....Very Stressful
1 2 3 4 5

Never.....Rarely.....Monthly.....Weekly.....Daily
N R M W D

		How Stressful?	How Often?
41.	Patients transferring out of your office to another area.	1 2 3 4 5	N R M W D
42.	Too much work.	1 2 3 4 5	N R M W D
43.	Lack of patient appreciation.	1 2 3 4 5	N R M W D
44.	Patients transferring into your office.	1 2 3 4 5	N R M W D
45.	Maintaining good relations with good referral sources.	1 2 3 4 5	N R M W D
46.	Patients not accepting the preferred treatment.	1 2 3 4 5	N R M W D
47.	Dealing with unrealistic patient expectations.	1 2 3 4 5	N R M W D
48.	Schedule being booked too far in advance.	1 2 3 4 5	N R M W D
49.	Frequent decision making.	1 2 3 4 5	N R M W D
50.	Treating a case with an unfavourable prognosis	1 2 3 4 5	N R M W D
51.	Patient's perception with the clinician as an inflictor of pain.	1 2 3 4 5	N R M W D
52.	Patients with broken appliances.	1 2 3 4 5	N R M W D
53.	Performing clinical tasks on a difficult or uncooperative patient.	1 2 3 4 5	N R M W D
54.	Patients being late for or missing banding/bonding appointments.	1 2 3 4 5	N R M W D
55.	Competition from other orthodontists.	1 2 3 4 5	N R M W D

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 9

Not Stressful.....Very Stressful
1 2 3 4 5

Never.....Rarely.....Monthly.....Weekly.....Daily
N R M W D

		How Stressful?	How Often?
56.	Quoting and collecting fees.	1 2 3 4 5	N R M W D
57.	Medical-legal cases.	1 2 3 4 5	N R M W D
58.	Accepting compromised treatment results.	1 2 3 4 5	N R M W D
59.	Feeling, with years, that work is becoming more routine.	1 2 3 4 5	N R M W D
60.	Treating emergency patients from other offices.	1 2 3 4 5	N R M W D
61.	Emergency patients.	1 2 3 4 5	N R M W D
62.	Being overworked.	1 2 3 4 5	N R M W D
63.	Physical demands of the practice.	1 2 3 4 5	N R M W D
64.	Making enough money to cover overhead expenses.	1 2 3 4 5	N R M W D
65.	Long working hours.	1 2 3 4 5	N R M W D
66.	Repayment of business/student loans.	1 2 3 4 5	N R M W D
67.	Trying to earn a living suitable to my lifestyle.	1 2 3 4 5	N R M W D

68. Overall, how stressful do you find the practice of orthodontics? Please use a scale form 0 (not stressful) to 100 (very stressful).

_____overall rating of orthodontic stress from 0 to 100.

SECTION III ⟶

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 10

SECTION III: For the following statements please indicate your level of agreement. Use the following scale:

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
SD	D	N	A	SA

1.	I have very little time to keep abreast of advances in the field of orthodontics.	SD	D	N	A	SA
2.	Malpractice litigation has not affected my treatment decisions.	SD	D	N	A	SA
3.	I do not get the respect that I deserve.	SD	D	N	A	SA
4.	My income allows me to provide very well for my family.	SD	D	N	A	SA
5.	I am skilled at dealing with my patients' orthodontic problems.	SD	D	N	A	SA
6.	Orthodontics fulfills my earliest career aspirations.	SD	D	N	A	SA
7.	My leisure time is very rewarding.	SD	D	N	A	SA
8.	I have enough time to improve my clinical skills.	SD	D	N	A	SA
9.	I am able to practice orthodontics the way I want to.	SD	D	N	A	SA
10.	The quality of general dentists and specialists to whom I can refer patients is low.	SD	D	N	A	SA
11.	I find my relations with patients satisfying.	SD	D	N	A	SA
12.	Orthodontics fulfills my current career aspirations.	SD	D	N	A	SA
13.	The income I receive from this practice is much too low.	SD	D	N	A	SA
14.	I wish I could drop my job to do something else.	SD	D	N	A	SA
15.	I enjoy the business aspects of my job quite well.	SD	D	N	A	SA

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 11

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
SD	D	N	A	SA

16.	I have been able to incorporate into my practice the technological changes occurring in orthodontics.	SD	D	N	A	SA
17.	I have enough time available for my personal life.	SD	D	N	A	SA
18.	If my child were interested in orthodontics, I would encourage him/her to pursue an orthodontic career.	SD	D	N	A	SA
19.	I enjoy the daily routine of my life.	SD	D	N	A	SA
20.	I enjoy the business side of my practice.	SD	D	N	A	SA
21.	The quality of my auxiliary personnel is lacking.	SD	D	N	A	SA
22.	I feel quite proud to be an orthodontist.	SD	D	N	A	SA
23.	I appear more satisfied with my job than I really am.	SD	D	N	A	SA
24.	Compared to other orthodontists, my total earnings are much lower than I desire.	SD	D	N	A	SA
25.	I do not have enough time to improve my clinical skills.	SD	D	N	A	SA
26.	Relating to patients is very frustrating for me.	SD	D	N	A	SA
27.	Knowing what I know now, I would make the same decision to go into orthodontics again.	SD	D	N	A	SA
28.	I am very likely to change careers in the next 5 years.	SD	D	N	A	SA
29.	There are an insufficient number of other non-orthodontic specialists to whom I can refer patients.	SD	D	N	A	SA
30.	I lack opportunities to provide quality care.	SD	D	N	A	SA

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 12

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
SD	D	N	A	SA

31.	Orthodontics is the place where I can make my best contribution.	SD	D	N	A	SA
32.	I enjoy the time I spend with my family.	SD	D	N	A	SA
33.	There is very little prestige associated with my work.	SD	D	N	A	SA
34.	I have sufficient time available for leisure activities.	SD	D	N	A	SA
35.	I do not enjoy interacting with my patients.	SD	D	N	A	SA
36.	Overall, I am extremely satisfied with my career.	SD	D	N	A	SA
37.	The work performance of my auxiliaries is outstanding.	SD	D	N	A	SA
38.	The business side of my practice is in shambles.	SD	D	N	A	SA
39.	The office staff works well together.	SD	D	N	A	SA
40.	I feel trapped by my current position.	SD	D	N	A	SA
41.	The threat of malpractice has caused me to alter significantly the way I practice.	SD	D	N	A	SA
42.	The income that I receive from my practice is most satisfactory for my needs.	SD	D	N	A	SA
43.	I manage the business aspects of the office very well.	SD	D	N	A	SA
44.	I have enough time to devote to my patients orthodontic needs.	SD	D	N	A	SA
45.	I have high quality general dentists and specialists to whom I can refer patients.	SD	D	N	A	SA

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 13

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
SD	D	N	A	SA

46.	I have sufficient time for professional contacts with my colleagues.	SD	D	N	A	SA
47.	My income is not nearly as high as that of other orthodontists.	SD	D	N	A	SA
48.	The quality of interpersonal care I provide is very high.	SD	D	N	A	SA
49.	I am happy with the friendships I have in my life.	SD	D	N	A	SA
50.	I find the diagnosis and treatment planning component of practice to be the most satisfying aspect.	SD	D	N	A	SA
51.	I enjoy my day-to-day interactions with others away from work.	SD	D	N	A	SA
52.	I am very pleased with my income compared to other orthodontists.	SD	D	N	A	SA
53.	I have very limited opportunity to discuss difficult cases with my colleagues.	SD	D	N	A	SA
54.	I enjoy helping patients.	SD	D	N	A	SA
55.	Overall, I am satisfied with my life.	SD	D	N	A	SA
56.	I an extremely pleased with the technical quality of my work.	SD	D	N	A	SA
57.	My income compares favorably to that of other professionals.	SD	D	N	A	SA
58.	I have too little time available for leisure.	SD	D	N	A	SA

Appendix B: Orthodontic Stress and Satisfaction Survey – Page 14

Thank you very much for taking the time to complete this survey. Please use the space below if you have any comments you would like to share about this topic or this survey. Return the survey using the provided envelope. Write your name on the response card and return it separately from the survey.

Comments:

Thanks once again!

Stephen F. Roth, D.D.S
Graduate Orthodontic Program
1041 Dentistry/Pharmacy Center
University of Alberta
Edmonton, Alberta
Canada
T6G 2N8

UNIVERSITY OF ALBERTA

Appendix C: Sample introduction letter

UNIVERSITY OF ALBERTA

May 23, 2001

Dentistry and Dental Hygiene
Excellence in Dental Health

Dr. «First_Name» «Last_Name»
«Address_1»
«Address_2»
«City», «Province»
«Postal_Code»

Dear Dr. «Last_Name»;

Greetings from the University of Alberta! I am writing to ask your help with an important research study. The title of this project is **"A Survey to Evaluate Occupational Stress and Job Satisfaction in Canadian Orthodontists."** I am distributing this survey to all practicing orthodontists in Canada. Your address was obtained from the listings published by your provincial regulatory body.

Occupational stress and job satisfaction has been well researched for many professions. Dentistry has been identified as having a relatively high amount of occupational stress. Clinical orthodontics, as you know, has many similarities to general dentistry. However, very little research has evaluated the occupational stress associated with orthodontics.

The survey will take about 20 minutes to complete. Your participation is voluntary and you may refrain from responding to questions if you wish. Your responses are anonymous. Your participation will be noted through the use of the response card, which is to be returned separately from the survey. You can also use the response card to request a summary of the results of the project.

This study is being performed through the University of Alberta Graduate Orthodontic Program in partial fulfillment of my Masters of Science thesis requirements. My research supervisor is Dr. Paul Major, Professor in the Department of Dentistry. It is sponsored by the McIntyre Fund of the University of Alberta. In accordance with University of Alberta regulations, all original surveys and response cards will be maintained in a secure area for a minimum of five years following the completion of the project.

If you have any questions or comments I can be reached through the Graduate Orthodontic Program at (780) 492-4469, or through e-mail at stephenroth@bigfoot.com. If you have any concerns about this research project, you may contact the Associate Dean and Department Chair of the Department of Dentistry, Dr. G. Wayne Raborn at (780) 492-3312.

Thank you very much for your help with this study.

Sincerely,

Stephen F. Roth, D.S.S.
Graduate Orthodontic Resident

Department of Dentistry
Faculty of Medicine and Dentistry

Dentistry/Pharmacy Centre • University of Alberta • Edmonton • Canada • T6G 2N8

Appendix D: Sample response card

Response Card

Dear Doctor;

Please print your name in the space below once you have completed the Orthodontic Stress and Satisfaction Survey. Return this card separately from the survey. This will allow us to record your participation while maintaining the anonymity of your responses.

_____

(PLEASE PRINT YOUR NAME AND PROVINCE)

Would you like to receive a summary of the results of this study?

Yes, please send me a summary of the results.
No, I will look for the published results.

Thank you very much for your participation in this study. Your time and effort are greatly appreciated.

Stephen Roth D.D.S.
University of Alberta
Graduate Orthodontics

UNIVERSITY OF ALBERTA

Appendix E: Sample reminder card

REMINDER CARD

Dear Doctor;

Hello again! Recently, you were sent a survey evaluating occupational stress and job satisfaction in Canadian orthodontists. I am sending this reminder because I have not received a reply card from you.

If you have already returned your survey, I would like to thank you for your help with this research project.

If you have not yet returned your survey, I would like to encourage you to do so. Each survey that is returned will increase the accuracy and reliability of our results. Your input would be greatly appreciated. If you require another copy of the survey, or if you have any questions or comments, I can be reached at (780) 492-3065 or stephenroth@bigfoot.com.

Thank you for your assistance. I look forward to receiving your response.

Stephen Roth D.D.S.
University of Alberta
Graduate Orthodontics

UNIVERSITY OF ALBERTA

Appendix F: Complete descriptive data of survey respondents.

Characteristic	*n*	
Age	313	Mean - 47.7 years SD - 10.4 years
Gender	318	
Male	269	84.3 %
Female	49	15.4 %
Marital status	318	
Single	25	7.9 %
Married	273	85.8 %
Separated/Divorced	17	5.3 %
Widowed	3	.9 %
Number of children	319	
0	58	18.2 %
1	30	9.4 %
2	107	33.5 %
3	84	26.3 %
4 or more	40	12.5 %
Years practicing orthodontics	318	Mean - 16.6 years SD - 10.4 years
Other residency training	303	
No	235	77.6%
Yes	68	22.4 %
AEGD/GPR/Hospital Internship	51	
Pediatric Dentistry	10	
Oral Maxillofacial Surgery	2	
Other/No response	5	
General dental practice prior to orthodontics	306	
No	74	24.4 %
Yes	232	75.8 %
Years GP experience	232	Mean - 4.2 years SD - 3.2 years
Other profession prior to dentistry	306	
No	288	94.1 %
Yes	18	5.9 %
Dental assisting/Dental hygiene	2	
Teaching	2	
Pharmacy	2	
Other/No response	12	

Appendix F: Descriptive data of survey respondents (cont.)

Province of primary practice	306	
British Columbia	59	19.3 %
Alberta	32	10.5 %
Saskatchewan	9	2.9 %
Manitoba	12	3.9 %
Ontario	125	40.8 %
Quebec	52	17.0 %
New Brunswick	8	2.6 %
Prince Edward Island	1	.3 %
Nova Scotia	6	2.0 %
Newfoundland	2	.7 %
Population of community of primary practice	301	
< 50,000	42	14.0 %
50,000 – 100,000	51	16.9 %
100,00 – 150,000	34	11.3 %
150,000 – 200,000	10	3.3 %
200,000 – 250,000	19	6.3 %
250,000 – 300,000	7	2.3 %
300,000 – 350,000	13	4.3 %
>350,000	125	41.5 %
Primary type of practice	317	
Solo Practice	206	65.0 %
Associateship – associate	22	6.9 %
Associateship – practice owner	22	6.9 %
Partnership	41	12.9 %
Group Practice	18	5.7 %
Academic	8	2.5 %
Staffing		
Patient coordinator	307	
No	203	66.1 %
Yes	104	33.9 %
Business manager	307	
No	197	64.2 %
Yes	110	35.8 %
Total number of staff	305	Mean – 6.6
		SD – 4.1
Part-time academics	311	
No	231	74.3 %
Yes	80	25.7 %

Appendix F: Descriptive data of survey respondents (cont.)

Satellite practice	317	
No	178	56.2 %
Yes	139	43.8%
Hours worked in the average week	317	Mean – 33.5 hours SD – 8.6 hours
Weeks vacation in the average year	316	Mean – 6.0 weeks SD – 2.6 weeks
Annual gross personal income from orthodontics	285	
< $50,000	4	1.4 %
$50,000 – $100,000	21	7.4 %
$100,00 – $150,000	21	7.4 %
$150,000 – $200,000	22	7.7 %
$200,000 – $250,000	33	11.6 %
$250,000 – $300,000	28	9.8 %
$300,000 – $350,000	24	8.4 %
$350,000 - $400,000	19	6.7 %
$400,000 - $450,000	13	4.6 %
>$450,000	100	35.1 %
Membership in C.A.O.	308	
No	41	13.3 %
Yes	267	86.7 %
FRCDSC	308	
No	257	83.4 %
Yes	51	16.6 %
Diplomate of ABO	308	
No	292	94.8 %
Yes	16	5.2 %
Days of continuing education in the average year	307	Mean – 9.9 days SD – 4.9 days
Member of study-club	311	
No	148	47.6 %
Yes	163	52.4 %

Appendix F: Descriptive data of survey respondents (cont.)

Any activity specifically for stress management	310	
No	268	86.5 %
Yes	42	13.5 %
Some form of physical exercise	33	
Meditation	4	
Other/no response	5	

Appendix G: Category, severity score and frequency score for potential stressors.

Item #	*Potential Stressor*	*Category*	*Severity score*		*Frequency score*	
			Mean	*S.D.*	*Mean*	*S.D.*
1	Managing adult patients.	Patient	2.50	0.96	4.17	1.07
2	Patients expressing that the fees are too high.	Income	2.40	1.08	2.62	0.94
3	The patient shows dissatisfaction with the care received. [a]	Patient	3.82	1.34	1.99	0.41
4	Difficult physical working condition. [b]	Work	2.35	1.26	2.09	1.16
5	Having to train new assistants. [c]	Staff	3.11	1.20	2.02	0.45
6	Trying to keep to a schedule. [b]	Time	3.33	1.09	4.00	1.23
7	Feeling inadequately trained to run a business.	Income	2.57	1.18	2.44	1.16
8	Patients being late for or missing adjustment appointments.	Patient	2.71	1.09	4.09	1.07
9	Maintaining good communication with other specialists.	Referral	1.90	0.91	3.15	1.18
10	Having difficulties gaining confidence of patients. [a]	Patient	2.09	1.05	2.40	1.12
11	General practitioners questioning case management.	Referral	3.11	1.21	2.06	0.51
12	Managing patients referred to you later than appropriate.	Referral	2.34	1.03	2.46	0.79
13	High concentration levels. [d]	Work	2.52	1.12	3.53	1.43
14	Managing disagreements with partners.*	Staff	3.00*	1.42*	2.01*	0.74*
15	Inability to meet my own expectations. [b]	Work	3.32	1.17	2.94	1.13
16	Motivating patients with poor elastic and/or headgear compliance.	Patient	2.98	1.02	4.09	0.99
17	Relapse in retention patients.	Work	3.28	1.00	2.94	0.85
18	Dealing with complaints from staff.	Staff	3.35	1.21	2.37	0.71
19	Getting along with patients. [c]	Patient	1.92	1.01	2.96	1.49
20	Managing paperwork.	Work	2.80	1.17	3.88	1.34
21	Staff leaving the office.	Staff	2.97	1.44	1.71	0.48
22	Patients or parents questioning expertise. [d]	Patient	3.00	1.32	1.91	0.56
23	Patients transferring to another office in your area.	Patient	2.88	1.40	1.80	0.51
24	Managing staff illnesses.	Staff	2.97	1.17	2.07	0.48
25	Pressure to debond from patient and/or parent.	Patient	3.17	1.09	2.61	0.93

Appendix G: Category, severity score and frequency score for potential stressors.(cont.)

Item #	*Potential Stressor*	*Category*	*Severity score*		*Frequency score*	
			Mean	*S.D.*	*Mean*	*S.D.*
26	Isolation from other orthodontists. [c]	Work	1.87	1.03	1.99	1.17
27	Motivating patients with poor OH and/or decalicification.	Patient	3.04	0.99	3.76	1.04
28	Realizing that your treatments are not permanent. [a]	Work	2.86	1.15	3.21	1.13
29	Communication problems with the staff. [d]	Staff	2.96	1.16	2.56	0.95
30	Falling behind schedule. [c]	Time	3.56	1.05	3.36	1.14
31	Maintaining good communication with general dentists.	Referral	2.62	1.09	3.26	1.14
32	Assuming a heavy financial burden. [a]	Income	3.21	1.33	2.60	1.25
33	Managing "burnt-out" patients.	Patient	3.08	1.01	2.67	0.92
34	Managing relations with a poor referral source.	Referral	2.95	1.16	2.21	0.62
35	Patients missing fee payments.	Income	2.78	1.07	2.71	0.82
36	Getting along with staff. [c]	Staff	2.66	1.32	1.99	0.73
37	Administrative duties. [b]	Income	2.62	1.10	3.09	1.30
38	Organizing and interacting with the staff. [b]	Staff	2.26	0.99	3.12	1.40
39	Feeling more and more lack of intellectual stimulation. [a]	Work	2.19	1.04	2.13	0.88
40	Constant time pressures. [d]	Time	3.31	1.18	3.84	1.33
41	Patients transferring out of your office to another area.	Patient	2.01	0.99	2.12	0.51
42	Too much work. [b]	Time	3.05	1.19	2.91	1.18
43	Lack of patient appreciation. [c]	Patient	2.55	1.06	2.42	0.89
44	Patients transferring into your office.	Patient	2.62	1.16	2.41	0.60
45	Maintaining good relations with good referral sources.	Referral	2.43	1.13	3.08	1.09
46	Patients not accepting the preferred treatment. [c]	Patient	2.53	1.08	2.46	0.81
47	Dealing with unrealistic patient expectations. [c]	Patient	3.40	1.13	2.47	0.75
48	Schedule being booked too far in advance.	Time	2.41	1.21	2.46	1.14
49	Frequent decision making.	Work	2.49	1.16	4.05	1.34
50	Treating a case with an unfavorable prognosis. [a]	Work	3.26	1.14	2.87	0.98
51	Patient's perception with the clinician as an inflictor of pain. [b]	Work	2.27	1.06	2.45	1.08
52	Patients with broken appliances.	Work	3.05	1.03	3.79	0.97

Appendix G: Category, severity score and frequency score for potential stressors.(cont.)

Item #	*Potential Stressor*	*Category*	*Severity score*		*Frequency score*	
			Mean	*S.D.*	*Mean*	*S.D.*
53	Performing clinical tasks on a difficult or uncooperative patient.	Work	3.75	1.04	2.93	0.91
54	Patients being late for or missing banding/bonding appointments.	Patient	3.31	1.17	2.62	0.87
55	Competition from other orthodontists. [c]	Income	2.63	1.19	2.78	1.22
56	Quoting and collecting fees. [d]	Income	2.53	1.08	3.53	1.38
57	Medical-legal cases.	Work	3.37	1.47	1.76	0.57
58	Accepting compromised treatment results	Work	3.21	1.02	2.58	0.71
59	Feeling, with years, that work is becoming more routine. [a]	Work	2.17	0.97	2.40	1.15
60	Treating emergency patients from other offices.	Work	1.63	0.82	2.01	0.53
61	Emergency patients.	Work	2.33	0.98	3.20	1.18
62	Being overworked. [a]	Time	3.19	1.21	2.99	1.17
63	Physical demands of the practice. [c]	Work	2.55	1.16	3.06	1.34
64	Making enough money to cover overhead expenses.	Income	2.44	1.36	2.27	1.26
65	Long working hours. [c]	Time	2.67	1.24	2.68	1.39
66	Repayment of business/student loans.	Income	2.08	1.27	1.94	1.16
67	Trying to earn a living suitable to my lifestyle. [b]	Income	2.19	1.14	2.29	1.29

[a] – item from Bourassa and Baylard, 1994.
[b] – item from Cooper, Mallinger andKahn, 1978.
[c] – item from O'Shea, Corah and Ayer, 1984.
[d] – item from Freeman, Main and Burke, 1995.
* - solo practitioners excluded, n=95 for severity, n=97 for frequency
n=293 to 318 depending on item number.

Appendix H: Multivariate regression analyses for occupational stress dependant variables.

Overall occupational stress score [a] *Overall R^2 = 0.359*			*Mean severity score* [a] *Overall R^2 = 0.214*			*Severity score mode* [b]		
Characteristic	*Nature*	*p-value*	*Characteristic*	*Nature*	*p-value*	*Characteristic*	*Nature*	*p-value*
Overall job satisfaction	-	.000	Overall job satisfaction	-	.000	Overall job satisfaction	-	0.000
Age	-	.000	Gender -Female	+	.002	Gender - Female	+	0.009
Participation in a study-club	+	.001	Days of continuing education a year	-	.006	Age	-	0.029
Hours worked a week	+	.005	Age	-	.011			
Part-time academics	+	.008	Participation in a study-club	+	.016			
Days of continuing education a year	-	.007						
Participation in stress management	+	.027						

[a] – analyzed by stepwise multiple regression
[b] – analyzed by multivariate ordinal regression

Appendix I: Stepwise multiple regression analyses for categories of occupational stressors.

Characteristic	*Nature*	*p-value*
Time-related stressors $R^2 = 0.211$		
Hours worked a week	+	.000
Gender – Female	+	.000
Overall job satisfaction	-	.007
Part-time academics	+	.008
Marital status – Separated/Divorced	-	.031
FRCD(C)	-	.033
Staff-related stressors $R^2 = 0.191$		
Age	-	.012
Overall job satisfaction	-	.000
Gender – Female	+	.007
Total number of staff	+	.018
Other residency training	+	.009
General practice experience	+	.007
Participation in a study-club	+	.023
Days of continuing education a year	-	.031
Patient-related stressors $R^2 = 0.189$		
Overall job satisfaction	-	.000
Gender – Female	+	.000
Province – Ontario or Manitoba	+	.002
Days of continuing education a year	-	.026

Appendix I: Stepwise multiple regression analyses for categories of occupational stressors. (cont.)

Characteristic	*Nature*	*p-value*
Work-related stressors $R^2 = 0.180$		
Overall job satisfaction	-	.000
Gender – Female	+	.000
Days of continuing education a year	-	.003
Part-time academics	+	.038
Income-related stressors $R^2 = 0.235$		
Overall job satisfaction	-	.000
Years of experience	-	.000
Gender – Female	+	.001
Province - Ontario	+	.027
Referral-related stressors $R^2 = 0.163$		
Province – Ontario	+	.001
Overall job satisfaction	-	.000
Gender – Female	+	.001
Business manager	+	.014
Days of continuing education a year	-	.045

Appendix J: Stepwise multiple regression analyses for facets of job satisfaction.

Characteristic	*Nature*	*p-value*
Delivery of care facet of job satisfaction $R^2 = 0.158$		
Overall occupational stress score	-	.000
Province - Saskatchewan	-	.002
FRCDSC	-	.012
Other profession prior to dentistry	-	.033
Patient relation facet of job satisfaction $R^2 = 0.158$		
Overall occupational stress score	-	.000
Marital status - Single	-	.003
Practice type - Partnership	+	.009
Part-time academics	+	.033
Perception of income facet of job satisfaction $R^2 = 0.427$		
Gross income	+	.000
Patient coordinator	+	.040
Membership in CAO	+	.002
Overall occupational stress score	-	.003
Population of community	-	.003
Other residency training	+	.022
Total number of staff	+	.007
Province - Manitoba	+	.047
FRCDSC	+	.020
Days of continuing education a year	-	.047
Personal time facet of job satisfaction $R^2 = 0.264$		
Overall occupational stress score	-	.000
Hours worked a week	-	.000
Practice type - associate	-	.015
Part-time academics	-	.020

Appendix J: Stepwise multiple regression analyses for facets of job satisfaction. (cont.)

Characteristic	*Nature*	*p-value*
Practice management facet of job satisfaction $R^2 = 0.238$		
Overall occupational stress score	-	.000
Practice type – Group practice	+	.003
Province - Quebec	+	.014
Patient coordinator	+	.015
Other residency training	+	.039
Professional environment facet of job satisfaction $R^2 = 0.088$		
Overall occupational stress score	-	.001
Age	-	.014
Practice type - Partnership	+	.019
Professional relations facet of job satisfaction $R^2 = 0.122$		
Province - Newfoundland	-	.000
Practice type – Solo practitioner	-	.005
Years of experience	+	.022
Province – Alberta	-	.009
Province - Quebec	-	.045
Professional time facet of job satisfaction $R^2 = 0.269$		
Overall occupational stress score	-	.000
Part-time academics	+	.007
Membership in a study-club	+	.006
Hours worked a week	-	.005
Practice location – British Columbia	+	.005
Gross income	+	.023
Population of community	+	.047

Appendix J: Stepwise multiple regression analyses for facets of job satisfaction. (cont.)

Characteristic	*Nature*	*p-value*
Respect facet of job satisfaction $R^2 = 0.230$		
Overall occupational stress score	-	.000
Membership in CAO	+	.000
Weeks vacation a year	+	.016
Diplomate of ABO	+	.024
Staff facet of job satisfaction $R^2 = 0.215$		
Overall occupational stress score	-	.000
Patient coordinator	+	.000
Weeks vacation a year	+	.016
Population of community	-	.018
Membership in CAO	+	.023
Overall quality of life scale $R^2 = 0.249$		
Overall occupational stress score	-	.000
Province - Saskatchewan	-	.001
Practice type - Partnership	+	.004
Hours worked a week	-	.010